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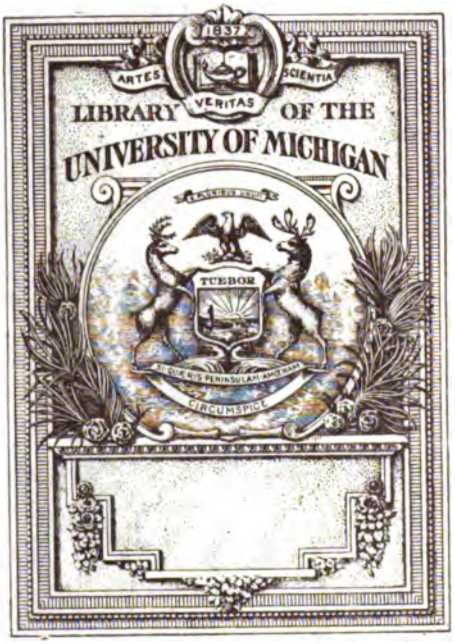

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EXHIBITING

A CONCISE VIEW

OF THE

LATEST AND MOST IMPORTANT DISCOVERIES

IN

MEDICINE, SURGERY, AND PHARMACY.

BRISTOL GENERAL HOSPITAL

VOLUME FIFTY-SIXTH.

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"In all these experiments, the quantity of fluid used for each injection was from four to six drachms."

# NOTICES TO CORRESPONDENTS.

Communications have been received from Dr **Knox**, Dr **James Y. Simpson**, Dr **Williamson**, Dr G. **Paton**, Mr **Graham**, Mr **Braid**, and Mr E. **Lee**,

The following Publications have been received:—

The Philosophy of Death; or a General Medical and Statistical Treatise on the Nature and Causes of Mortality. By John Reid, Licentiate of the Faculty of Physicians and Surgeons, Glasgow. London and Edinburgh, 1841. 12mo. Pp. 381.

A General Outline of the Animal Kingdom, and Manual of Comparative Anatomy. By Thomas Rymer Jones, F. Z. S., Professor of Comparative Anatomy in King's College, London, &c. illustrated by 336 Engravings. London, 1841. 8vo. Pp. 732.

Elements of Medicine. Vol. ii. on Morbid Poisons. By Robert Williams, M. D. Trin. Coll. Cambridge, &c. London and Paris, 1841. 8vo. Pp. 682.

Observations on the Surgical Pathology and Treatment of Aneurism; being the substance of a Course of Lectures on that Disease, delivered in the School of the Royal College of Surgeons in Ireland during the Session 1839—1840. Part I. By William Henry Porter, A. M., Professor of the Theory and Practice of Surgery in the Royal College of Surgeons in Ireland, &c. Dublin, 1841. 8vo. Pp. 214.

The principal Baths of Germany considered with reference to their Remedial Efficacy on Chronic Disease. By Edwin Lee, Esq., M. R. C. S. Volume I. Nassau, Baden, and the adjacent districts. London and Paris, 1840. Pp. 172. Part the Second, Central and Southern Germany; with an Appendix on the Cold Water Cure. London, Paris, Frankfort, and Wisbaden, 1841. Pp. 134.

The Sanative Influence of Climate; with an Account of the best places of Resort for Invalids in England, the South of Europe, &c. By Sir James Clark, Bart. M. D., F. R. S. &c. Third Edition. London, 1841 Post 8vo. Pp. 377.

Practical Observations on the Pathology and Treatment of Strictures of the Urethra, with Cases. By Robert Wade, Senior Surgeon to the Westminster General Dispensary, &c. &c. London, 1841. 8vo. Pp. 149.

On the Diseases and Derangements of the Nervous System in their Primary Forms, and in their Modifications by Age, Sex, Constitution, Hereditary Predisposition, Excesses, General Disorders, and Organic Disease. By Marshall Hall, M. D., F. R. S. L. and E. &c. London, Paris, and Leipzig, 1841. 8vo. Pp. 380.

Spinal Affections. A Popular Lecture on Disorders and Diseases of the Spine, in which the Causes, Nature, Symptoms, and Curative Treatment of these affections are Investigated and Explained. By Henry Crowhurst Roods, M. R. C. S. London, 1841. 12mo. Pp. 57.

On Gout: Its Cause, Nature, and Treatment. By John Parkin, Honorary and Corresponding Fellow of the Royal Academies of Medicine and Surgery in Madrid, Barcelona, and Cadiz, &c. &c., M. R. C. S. London, &c. &c. London, 1841. 8vo. Pp. 140.

Report of the Cases attended at the Birmingham Eye Infirmary during the years 1838 and 1839. By Richard Middlemore, Esq. Surgeon to the Infirmary. (From the Transactions of the Provincial Med. and Surg. Association.) Worcester, 1841. 8vo. Pp. 20.

The Transactions of the Provincial Medical and Surgical Association, instituted 1832. Vol. IX. London and Worcester, 1841. 8vo. Pp. 583.

On Stammering and Squinting, and on the Methods for their Removal. By Edwin Lee, M. R. C. S. &c. London, 1841. 8vo. Pp. 88.

Exposé Sommaire des Ouvrages, Memoires, Travaux Scientifiques et Inventions du Dr Le Roy-D'Etiolles, a l'appui de sa Candidature a l'Academie de Medecine. Paris, 1841. 4to. Pp. 40.

The Physiology of Vision. By William Mackenzie, M. D., Surgeon-Oculist in Ordinary to the Queen, Lecturer on the Eye in the University of Glasgow, &c. London, 1841. 8vo. Pp. 292.

A Medical Guide to Nice; containing every necessary information to the invalid and resident stranger. With separate remarks on all those diseases to which climate is calculated to prove injurious or beneficial, especially on Consumption and Scrofula, &c. By William Farr, M. D. &c. London, 1841. Post 8vo. Pp. 177.

Report upon the Mortality of Lunatics. By William Farr, Esq. F. S. S. (Read before the Statistical Society of London, 15th March 1841.) April, 1841. Pp. 17. 8vo.

Hints for Invalids about to visit Naples; being a Sketch of the Medical Topography of that city. Also an Account of the Mineral Waters of the Bay of Naples; with Analysis of the most important of them, derived from authentic sources; with Engravings. By J. C. Cox, M. D. &c. London, Paris, and Nottingham, 1841. 8vo. Pp. 190.

The London Medical Gazette for the Session 1840—1841. No. 26, (694,) 20th March 1841, to No. 36, (704,) 28th May 1841.

Gazette Medicale de Paris, No. 11. Samedi, 13th Mars a No. 24. Samedi, 12th Juin 1841. Tome ix.

The Medico-Chirurgical Review and Journal of Practical Medicine, No. 68, April 1841. Being No. 28 of a Decennial Series. Edited by James Johnson, M. D., &c. and H. J. Johnson, Esq. London, 1841.

Nuces Philosophicae, or the Philosophy of Things as developed from the Study of the Philosophy of Words. By Edward Johnson, Esq., Author of Life, Health, and Disease. London, 1841. No. 4, April 1841; and No. 5, May 1841. P. 137—232. No. 3 not received.

The British and Foreign Medical Review, or Quarterly Journal of Practical Medicine and Surgery. Edited by John Forbes, M. D. &c. No. 21, January 1841, and No. 22, April 1841. London.

Weekly Tables of Mortality for the Metropolis. No. 49, 12th December 1840, to No. 52, 2d January 1841; and No. 1, 9th January 1841, to No. 21, 29th May 1841. No. 9 not come to hand.

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—— 90, 7th from the bottom, *for* ear *read* air.
—— 93, 18 from top, *for* imported, *read* imparted.
—— 94, 11 *for* air, *read* ear.
—— 97, 16 *for* unaccompanied, *read* accompanied.
—— 100, 18 *for* vesicles, the vesicular, *read* bronchia, the bronchial.
—— 101, 8 *for* distinct, *read* distant.
—— 462, *for* Plate X. Figs. 1st, 2d, 3d, and 4th, *read* Plate VII. Figs. 5th 6th, 7th, and 8th.
—— 520, 13 from top, *for* putridal, *read* paludal.

## NOTICES TO CORRESPONDENTS.

Communications have been received from Dr GUY, Dr CATLETT, SIR GEORGE BALLINGALL, Mr LEE, Mr WILLIAM EWART,

The following Publications have been received:—

Consultation Medico-Legale sur quelques signes de Paralysies Vraies et sur leurs valeur relative. Par D. Macloughlin, M. D. d'Edinburgh. Paris, 1841. 8vo. Pp. 83.

Facts connected with the Treatment of Insanity in St Luke's Hospital; with letters on the subject to Lord Brougham, the Committee of St Luke's Hospital, Drs Birkbeck, Elliotson, and others; and an Introductory Lecture to the most Noble the Marquis of Normanby. By a Lady. Lond. 1841. Pp. 54.

A Visit to Thirteen Asylums for the Insane in Europe; to which are added a brief notice of similar Institutions in Transatlantic Countries, and in the United States; and on the Causes, Duration, Termination, and Moral Treatment of Insanity, with copious Statistics. By Pliny Earle, M. D. Resident Physician of Friends' Asylum for the Insane, Franckford, near Philadelphia, &c. 1841. 8vo. Pp. 144.

Anatomical Observations on the Analogous Structure and Uses of the Lingualis and Panniculus Carnosus Muscles. By James Mercer, M. D. &c. Lecturer on Anatomy and Physiology, Edin. (From Med. Gazette, 703.) Edinburgh, 1841. 8vo. Pp. 16.

A Catalogue of Plants collected in the neighbourhood of Banbury. By George Gulliver, F. R. S. &c. Assistant-Surgeon to the Royal Regiment of Horse-Guards. London, 1841. 12mo. Pp. 37.

Medical Report to the Managers of the Lunatic Asylum of Aberdeen for the year ending 30th April 1841. Aberdeen, 1841. 8vo. Pp. 20.

On the Construction and Management of Hospitals for the Insane; with a particular Notice of the Institution at Siegburg. (This is omitted.) By John Maximilian Jacobi. Translated by John Kitching. With Introductory Observations by Samuel Tuke. London, 1841. 8vo. Pp. 299.

A Dictionary of Practical Medicine: Comprising General Pathology, the Nature and Treatment of Disease, Morbid Structures, and the Disorders especially incidental to Climates, to the Sex, and to the different epochs of life, &c. By James Copland, M. D., F. R. S. &c. Part VII. London. Insanity—Kidneys, Diseases of the. P. 497 to 640.

A Complete Practical Treatise on Venereal Diseases and their immediate and remote consequences. Including Observations on certain affections of the Uterus attended with discharges. By William Acton, late Externe at the Female Venereal Hospital, Paris. London, 1841. 8vo. P. 410. With an Atlas of Engravings.

The Sources and Mode of Propagation of the Continued Fevers of Great Britain and Ireland. By William Davidson, M. D. Senior Physician to the Glasgow Royal Infirmary, &c. The Thackeray Prize-Essay. London, 1841. 8vo. Pp. 80. (Reprinted from the British and Foreign Medical Review.)

The Fourth Fasciculus of Anatomical Drawings. Selected from the Colection of Morbid Anatomy in the Army Medical Board Museum at Chatham. Drawn on Stone. By George H. Ford. London, 1841. Folio. Ten Plates.

The Anatomy of the Arteries. By Richard Quain, Professor of Anatomy in London University College. Part VIII. Five Plates, with Letterpress. Imperial Folio.

Philosophical Nuts; or the Philosophy of Things, &c. By Edward Johnson, Esq. Author of Life, Health, and Disease. London, August 1841. No. 8. P. 329–376.

A Practical Treatise on the Efficacy of Mineral Waters in the Cure of Chronic Disease, illustrated by Cases; with an Appendix containing an Analysis of the most Reputed Spas in Germany. By Sir Alexander Mackenzie Downie, M. D. Frankfort O. M. 1841. 12mo. Pp. 219.

A Short Description of Kissingen, its Baths, and Mineral Waters. Translated from the German of Dr F. A. Balling. By Sir Alexander M. Downie, M. D. &c. Frankfort O. M. 1841. 12mo. Pp. 44.

The Cure of Strabismus by Surgical Operation. By William Mackenzie, M. D. Surgeon-Oculist in Scotland in Ordinary to Her Majesty the Queen, &c. London, 8vo. 1841. Pp. 30.

State of an Institution, New York, called the Retreat for Persons afflicted with Disorders of the Mind. 12mo. P. 16. York, 1841.

Three Memoirs on the Developement and Structure of the Teeth and Epithelium. Read at the Ninth Annual Meeting of the British Association held at Birmingham in August 1839, with Diagrams exhibited in illustration of them. By Alexander Nasmyth, F. L. S., F. G. S., Member of the Royal College of Surgeons, &c. London, 1841. 8vo. Pp. 47.

The Medico-Chirurgical Review and Journal of Practical Medicine. No. 69. July 1841. Being No. 27 of a Decennial Series. Edited by James Johnson, M. D. and Henry J. Johnson, Esq. London, 1841. 8vo.

The American Journal of the Medical Sciences. Edited by Isaac Hays, M. D. No. 2, New Series. April 1840. Philadelphia.

The New York Journal of Medicine and Surgery. Published Quarterly. No. VII. January 1841. No. VIII. April 1841. New York.

The British and Foreign Medical Review or Quarterly Journal of Practical Medicine and Surgery. Edited by John Forbes, M. D., F. R. S. &c. No. XXIII. July 1841. London.

The London Medical Gazette for the Session 1840-1841. New Series. No. 37, (705), 4th June 1841 to No. 51, (719,) September 10, 1841.

Gazette Medicale de Paris. No. 25. Samedi, 19 Juin 1841, a No. 37. Samedi, 10th September 1841.

L'Examinateur Medicale. No. 1. Dimanche, 27th June 1841, a No. 7, Dimanche, 8th Aout. No. 9, Dimanche, 22d Aout, a No. 12, Dimanche, 12th September 1841.

Comptes-Rendus Hebdomadaires. No. 2. 12 Juillet 1841.

Weekly Tables of Mortality for the Metropolis, No. 22. 5th June 1841, to No. 35, 4th September 1841.

THE

EDINBURGH

MEDICAL AND SURGICAL JOURNAL.

1. JULY 1841.

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# PART I.

## ORIGINAL COMMUNICATIONS.

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### ART. I.—*Cases and Observations illustrative of the Nature of Gangrene of the Lungs.* By DAVID CRAIGIE, M. D. F. R. S. E. Physician to the Royal Infirmary.

SINCE the time when Laennec directed attention to the peculiar characters of gangrene of the lungs, a considerable number of instances of that lesion have been recorded by Schroeder, Lorinser, Dr Bright, Andral, and Cruveilhier. It is nevertheless a disease, the presence of which it is difficult to distinguish in the early stage from that of other diseases of the lungs; its determining causes are totally unknown; and it is not known that in any genuine instance of it the patient has made a recovery. During the last six months three cases of this lesion have fallen under my own observation; and I think they are sufficiently important to deserve being recorded. I shall premise one case which fell under my observation in the spring of 1837.

CASE I.—Mary Goodall, aged 24, was admitted into the Royal Infirmary on Thursday the 16th of February 1837, in consequence of symptoms indicating affection of the brain and lungs.

She stated that she had lately recovered from an attack of influenza, and that on Thursday last, the 9th of February, she was attacked with pain in both temples, which gradually increased in severity. This pain, however, was not at all times equally severe, and sometimes she represented it to be merely a dull sense of uneasiness. She had not suffered any pain in the epigastric region, but she had vomiting taking place early in the morning. The skin presented no eruption. She had little thirst; the tongue was covered with a viscid whitish-gray fur; and the bowels were stated to be confined. She believed herself to be in the sixth month of pregnancy.

At admission, the pain of the head, and especially in each temple, continued; but the eyes were not injected, nor the temporal arteries distended. The expression of the countenance was heavy and listless, the eyes heavy and languid, and the aspect that of a person who did not readily comprehend questions, and who seemed to be wakened out of sleep.

There was slight cough, with puriform expectoration; the respiration was hurried, 28 in the minute, and accompanied with large moist rattling in the right mammary region. The sound elicited by percussion was neither unusually dull nor clear. In both subclavicular regions was a good deal of bronchophony, with marked resonance of the voice, amounting under the right clavicle nearly to pectoriloquy. The action of the heart was natural, from 68 to 70 in the minute.

Two compound colocynth pills were ordered, and afterwards a dose of the saline infusion of senna.

17th, Next day the cough was not complained of, but expectoration of the same character continued. The pulse was 72. The bowels had not been opened. Two scruples of the compound rhubarb powder in peppermint-water were given, and afterwards one ounce of castor-oil.

18th. Expectoration of dense opaque puriform matter continued. The headach had interrupted sleep, and continued more severely than yesterday. Both draughts were rejected by vomiting; she had some sickness and vomiting in the morning; no motion took place, nor did any effect follow the use of an enema. The tongue was covered with a whitish fur; the pulse continued at 68; the voice was strongly resonant, especially in the left scapular region; the respiration was bronchial, but without rattle or wheezing. In the right submammary region the moist crepitating rattle was still audible.

Eight leeches were applied to each temple; a purgative enema was ordered to be administered; and afterwards one blue pill and two colocynth pills were to be given and repeated in the course of two hours.

19th. The leeches bled freely, and the pain of the frontal region speedily underwent abatement. Three motions took place; the vomiting did not return; the tongue, however, was covered with a dry fur; the pulse was 68, rather feeble; and the extremities were cold. She had a listless and depressed look. The cough was abated, and the expectoration was diminished in quantity.

She was ordered one ounce of the saline ammoniated mixture every second hour, two colocynth pills at bed-time, and tea in order to quench thirst.

20th. She slept imperfectly during the night, in consequence of pain referred to the orbits and eyeballs, but without intolerance of light. One motion took place; the tongue was still covered with a rough file-like dry grayish coloured fur; the pulse was 60, extremely feeble; and the listless look with dull heavy eye, as if roused from sleep, continued. When interrogated as to the pain of the head, she stated that it was felt in both temples, most towards the right; but she did not distinctly say whether it was pain or weight, or a sense of constriction. She complained of some uneasiness in the left side of the breast; and an offensive smell issued from the breath.

A blister was applied to the coronal and vertical region of the head, and one to the left breast; the saline ammoniated mixture was continued; six grains of calomel, with three of extract of colocynth, were directed to be given; and afterwards one drachm of the compound jalap powder.

In the afternoon of the same day, about six, she fell into a state of complete insensibility and unconsciousness, with slow languid respiration; dilatation of the right and contraction of the left pupil; spastic rigidity of the voluntary muscles, and loss of the power of deglutition; the pulse at 60, feeble, and the extremities cold. Twenty leeches were applied to the temples, and produced a free discharge of blood, but without manifest alleviation of the symptoms; and at ten o'clock the same night, eighteen ounces of blood were drawn from the arm, with the effect of raising the pulse to 80, but rendering it irregular. A blister was also applied to the occipito-cervical region, sinapisms to the legs and feet, and a terebinthinate enema was administered. As the insensibility and unconsciousness continued, the veins were reopened at twelve, and eight ounces of blood withdrawn.

21st. She continued much in the same state. The bowels were moved several times during the night, and the urine was withdrawn by the catheter. This morning, however, before ten, she spoke and swallowed liquids. Twenty more leeches were applied to the temples, and bled freely; and the blisters have since produced vesication.

At the hour of visit, (twelve noon,) she had recovered some degree of sensibility and consciousness, being capable, when requested, of protruding the tongue, which was covered with a white moist fur, and of raising the hand to the right temporal region, as the part most affected with pain. The pulse was 96, quite regular, but rather small; the respiration 24, languid and feeble, but regular, and not laborious. No expectoration had taken place since the commencement of the attack of insensibility and loss of motion; but the breath and the person in general exhaled an offensive and fetid odour.

Ten ounces of blood were directed to be drawn from the arm; ice to be applied to the frontal and coronal regions; six grains of calomel, with two drops of croton oil, and three grains of colocynth, were to be given as a cathartic; and a purgative enema, with two ounces of oil of turpentine, was directed to be administered.

22d. Twelve ounces of blood were drawn from the arm immediately after the visit; and ten ounces were drawn from the temples by cupping, at six in the evening. Several motions took place. She swallowed easily in the morning, and could indicate by signs, and saying yes or no, that the pain of the right frontal region was gone. She was also completely conscious and sensible to external impressions, but very feeble, drowsy, and listless. The pupil was contractile to light; the pulse was 120, small; the countenance was pale; the tongue was covered with a moist gray fur.

Four ounces of the saline infusion of senna were directed to be given immediately, and repeated at the end of two hours.

23d. Four motions took place, and the urine had been voided by the spontaneous efforts of the bladder. She, however, had several rigors during the night and in the morning. The pulse was 140, rather small. She complained still of pain over the greater part of the head, did not seem to comprehend questions, looked stupid, answered slowly, and carried the right hand slowly to the right side of the head. The pupils were natural and contractile. The breath emitted a very fetid odour; but no expectorated matter or anything vomited had been seen.

Twelve leeches were directed to be applied to the right temple; and six grains of calomel, one grain of extract of scammony, and three grains of extract of colocynth were directed to be given in the form of electuary in honey.

24th. Next day the leeches had bled well, and three motions had taken place. Last night, without previous symptom, she was delivered of a dead fœtus of about six months, and the placenta was expelled without subsequent hemorrhage. She continued much in the same state during the night; and was still able to swallow, and take food and drink. She made no complaint of headach; but the eye was turbid and glassy; the expression listless and stupid; and the cheeks were flushed. The pulse was 116, of better strength. The tongue was cleaner, but rather smooth and dry. The breath was offensive; but she coughed little.

Medicines were given up; but diet was continued.

25th. Spent a quiet night with sleep, but was still stupid and somnolent. She made no complaint of headach or pain in the belly. Both pupils were contractile; the cheeks were still flushed; the tongue was covered with a dry glassy fur; the pulse 116; one motion.

One drachm of the compound jalap powder was ordered, and afterwards one ounce of castor oil.

On the 26th, she was still in a languid listless state, as if half asleep, and could be roused, though with difficulty. The eyes were spasmodically turned up; the tongue was still dry; and the pulse 104. As the bowels had not been moved, the medicine was directed to be repeated. One pound of beef-tea was allowed during the course of the day.

27th. She continued much in the same state as yesterday, was perhaps a little more conscious and more sensible to external impressions; and took food and drink, though imperfectly. The eyes are still spasmodically turned upwards; the pupils contract slowly when light is applied; she makes no complaint of headach. The pulse 108, small; no indication of pain in the belly, but very strong pulsation of abdominal aorta. The tongue is cleaner, but still preternaturally red and glassy. Three motions took place.

Ice was directed to be applied to the forehead; the skin behind the ear to be blistered by blistering liquid; and four ounces of saline infusion of senna, with half an ounce of tincture of senna to be given.

28th. The medicine produced three motions, and the blister rose imperfectly. She continued, nevertheless, in the same state of stupor and somnolence; but was rather more easily roused, and showed greater consciousness of external impressions. She made no complaint of pain or uneasiness either in the head, chest, or abdomen. The complexion was clearer; but the eyes were dull and heavy, and the expression was drowsy and vacant. The tongue was dry, red, and glassy. The pulse 100, of good strength.

Six ounces of blood were directed to be drawn from the right occipital region; and some of the saline infusion, followed by castor oil, was directed to be given.

March 1st. Only four ounces of blood were drawn, and three motions took place; but the symptoms of listlessness, somnolence, and stupor continued, and some rigidity was observed in the muscles of the upper extremity. The tongue was still covered with a glassy dry fur. The pulse was 120, rather small.

The scalp was directed to be again shaved, and a blister applied to the coronal and vertical region. The saline infusion of senna was repeated.

On the 2d, the blister had risen well; but the symptoms were unchanged. Next day, however, (3d,) she gave evidence of a greater degree of consciousness, and paid more attention to external impressions. The face was less flushed; the pulse 132, small; and the tongue still red, dry, and glassy. Some sero-sanguine discharge had taken place from the vagina since yesterday. In the latter part of this day and in the course of the fourth, the muscles of the trunk, and especially those of the extremities, were agitated with tremulous motions. The breath continued offensive, but less strongly than formerly.

One drachm of the compound jalap powder was directed to be given in the morning.

Several motions followed from the powder.

But the shaking and tremulous motion of the muscles continued unabated. The right pupil contracted slowly and imperfectly. The pulse was 140, small; the tongue glassy and dry.

On the 6th, she was less sensible and less conscious; the stupor and debility were greater; the countenance had the hippocratic expression; and, after continuing some hours in this state, she died calmly at eleven at night.

The body was inspected on the 9th, and disclosed the following appearances.

*Head.*—The membranes of the brain were somewhat thickened by the effusion of sero-albuminous fluid within the subarachnoid tissue. The vessels of the *pia mater* were much loaded with dark-coloured blood.

These appearances were most conspicuous in the right hemisphere, the convolutions of the posterior part of which were much and distinctly flattened.

On examining the right hemisphere at its posterior region, it was found soft, compressible, and undulating; and on attempting to remove the brain from the cranium by the most gentle handling, a quantity of opaque greenish yellow purulent matter escaped from a small lacerated aperture at the posterior end of the hemisphere and on its mesial margin. When an incision was made through this, it disclosed an oblong irregular cavity about two inches and a-half long, and one inch broad at its broadest part, nearly of this shape ⬭, filled with greenish yellow purulent matter, and with rough irregular flocculent rugged walls. This cavity did not communicate with the right lateral ventricle, but was situate partly above, partly behind the posterior cornu.

The arteries of the brain were slightly roughened interiorly by steatomatous or waxy-like deposit.

The rest of the brain was healthy.

The right lung presented in the lower part of its upper lobe and the upper part of the middle lobe, both of which were united by adhesion, a portion softened, broken down, irregular, of a brownish inky colour, and effusing an inky brownish fluid, and exhaling a very fetid and offensive odour. This softened and broken down portion was irregular in shape, and might be as large as a common sized egg. The central part was most destroyed, and indeed it was converted into a homogeneous soft brownish-black mass. The margins were less softened, and terminated insensibly in sound lung. The bronchial tubes were loaded with foul viscid bloody-coloured mucus. The middle and upper lobe adhered to the *pleura costalis*. The left lung was free from disease; but a little emphysematous.

The mucous membrane of the stomach was extensively softened at the cardiac and splenic ends.

*Epicrisis.*—This case is remarkable in presenting two distinct lesions, each very important, and each alone sufficient to have caused the fatal termination. I have recorded the case also, not only as a good example of inflammation of the brain terminating in suppuration, but also as a case illustrating the mode in which disease of the brain influences and obscures the symptoms of disease of the lungs.

Though in this case the symptoms of disease in the brain had taken place previous to admission, and were also present at the time of admission, yet they did not present so prominent and distinct a character as they afterwards assumed, and the patient evidently thought the disorder of the lungs the most serious complaint under which she was labouring. From the puriform expectoration, the cough, and the sound of large moist rattling in the right mammary region, it was inferred, that a tubercular cavity was forming in that region, that is, about the lower part of the upper lobe of the lungs, or that there might be some pneumonic abscess forming in that region. The former inference was believed to be confirmed by the strong resonance heard in the right subclavicular region. As the cough and expectoration, with this peculiar rattling, continued on the 18th, it was still believed that some process of this kind, which could not be easily arrested by the use of remedies, was going on. On the 19th, the cough was abated, and the expectoration was diminished in quantity, apparently spontaneously; and, excepting the rattling, it would have been inferred that the lesion was subsiding. Next day, however, the offensive smell of the breath denoted clearly the nature of the pulmonary disorder under which she was labouring, and it could no longer be doubtful, that part of the right lung was in a state of gangrene. The fetid smell of the breath continued to be felt more or less strongly during the whole course of the disorder, to its termination; and, though sometimes less forcible and more faint, it was never wholly absent. It is remarkable, however, that the cough abated much, and little matter was expectorated, apparently partly from inability to cough, and partly from the bronchial mucous membrane not transmitting its impressions to the expiratory muscles with the energy, with which they are known to do, when the influence of the brain and nervous system is unimpaired.

It is true, that this inference regarding the existence of gangrene of part of the lung did not interfere with the previous inference of the existence of a tubercular cavity, or even pneumonic abscess. For it sometimes happens, that part of a tubercular mass, or the surrounding lung, is affected with gangrene; and such a mode of origin was not inconsistent with the history and actual symptoms of this case. The general and sudden obscuration, however, of most of the symptoms of disease of the lung, and the distinct and unequivocal urgency of those indicating disease of the brain, put a stop in the meantime to all speculation on this subject, and by demanding immediate attention to the moderation and extinction of the cerebral symptoms, caused the symptoms of the pulmonary disorder to be less closely attended to.

It is not easy to determine the commencement of this dangerous affection of the lungs. It is clear that it was present on the 16th of February, when the patient was admitted; for this was indicated by cough, the symptoms of purulent expectoration and moist mucous rattling in the right mammary region; and the fetid smell of the breath, which was recognized on the 19th, merely indicated that a communication had taken place, on that or the previous day, between the gangrenous portion and the air in the larger bronchial tubes.

It is not, however, quite so clear how long previous to this date the disorder of the lungs had existed. The statement regarding the attack of influenza gave no accurate information regarding the origin of the pulmonary disorder; for when the patient was requested to mention her symptoms at that time, she answered that she had cough and considerable weakness. If we suppose that the pulmonary disorder, which terminated in gangrene, began at the time at which the patient was labouring under the catarrhal symptoms, then it must have begun at least ten or twelve days before the 9th of February, that is, some time about the close of January 1837. If this estimate be correct or well-founded, then the pulmonary disorder lasted between 35 and 45 days, probably more nearly the latter time, and at least 20 days elapsed before the first symptoms of gangrene became manifest.

It appears to have been while this pulmonary disorder was advancing, and when it had been established about ten or twelve days, that the symptoms of disease of the brain first began to give evidence of their presence.

There could be little doubt that the disorder of the brain, which terminated in suppuration, began, at least, on the 9th of February, that is, seven days before admission, and eleven days before the attack of coma and paralysis. At this date, she first felt the pain in the temples, and had vomiting, a symptom which, if not uniformly, is, at least, pretty frequently present in inflammation of the brain or its membranes. At the same time, it must be observed, that, from the circumstance of her representing herself to be pregnant six months, it was supposed possible that the vomiting might be connected with this state. When, however, it was observed to recur on the 17th, and to be connected with pain in the right temple; and when the languid, listless look, the heavy, drowsy expression, and slow comprehension of questions, peculiar to patients labouring under symptoms of disease of the brain,—were considered,—it became impossible to doubt that in that organ some morbid action had been commenced, and was proceeding steadily to disorganization.

[I find that in my clinical notes on the case, I had first looked on it as an instance of meningitis.]

This conclusion was put beyond doubt by the symptoms which took place on the evening of the 20th February. Though in the usual state at the hour of visit, she was attacked about six hours after with loss of consciousness and sensibility, and palsy of the muscles of deglutition, and incomplete palsy of the voluntary muscles generally, with slow pulse and respiration.

Though some of these symptoms subsided, and were abated in intensity under the use of remedies, they never totally disappeared; and she continued to present the semi-comatose or somnolent state, with the slow obscure intelligence throughout the whole course of the disorder to its termination on the 6th of March.

Though the occurrence of the rigors at two or three periods in the course of the disorder, but especially during the night of the 22d and morning of the 23d of February, led to the conjecture that purulent matter was forming either in the brain or in the lungs, yet their disappearance, and the circumstance of their not returning, rendered this doubtful. The flushed cheek, the dry tongue, and the rapid pulse, equally indicated disorder of the lungs; and had it not been for the listless stupid expression of the patient and the somnolence, though it was still to be inferred that the brain or it membranes was affected, it did not follow that the lesion should be of the severe and serious nature which dissection disclosed. Even the absence of very marked symptoms of paralysis, and the degree of recovery from the symptoms of coma and convulsion, which took place on the 20th of February, were calculated to lead to the inference, that the lesion, though serious, had not proceeded to the extent of softening or of suppuration. When, however, the extensive purulent collection was found in the posterior lobe of the right hemisphere, it in some degree explained some of the symptoms, and, by disclosing a lesion not altogether expected, it showed that suppuration of a considerable portion of the brain might ta place, yet without the occurrence of the symptoms usually alle to indicate so considerable a lesion.

The whole duration of this lesion, from its commencem the 9th of February, till the date of the fatal event, on of March, occupied twenty-four days.

The early part of this period, viz. between the 9th of February and the 16th, when headach came on, and was felt more or less the whole time, was most probably the first or inflammatory stage of the disorder. Yet it is important to observe, that this pain, which was felt in both temples, was the only symptom, except the vomiting, denoting affection of the brain or its circulation. There was no confusion of thought, no loss of memory, no incoherence of language, and, in short, no delirium or mental disorder. The pulse was not more than 72, and on the 18th it was only 68, yet without any indication of coma. It is also to be observed, that this pain was sensibly abated by so moderate an evacuation as the bleeding produced by sixteen leeches applied to the temples. That the morbid action, however, was not removed, was clearly shown by the recurrence of the pain in the orbit and eyeballs the following evening, (19th); and more especially by the attack of coma and convulsions the ensuing evening, viz. the 20th.

The whole of these facts are important in showing that a severe and rapidly destructive action may be established in certain regions of the brain, and probably under certain circumstances of previous disease in other organs, without giving rise at first either to very acute pain, or to any great disturbance in the mental faculties. This is probably to be regarded as showing, that the posterior lobe of the hemisphere may be the seat of considerable disorder, without necessarily producing disturbance in the mental faculties.

I have said that between the 9th and the 16th February, and, I might add, a few days after, the disease was probably in its early or inflammatory or vascular stage. At least, there is little reason to think that suppuration had then commenced, or that there was more than mere inflammatory injection of the posterior part of the hemisphere at this time. On the evening of the 20th, however, there is every reason to believe that a considerable change in the morbid action had taken place; either that the inflammatory action had become more extensive or more intense, and more concentrated to a particular point, or that it was then tending to the destruction of the part by the formation of lymph and purulent matter.

It is here also to be observed that, previous to this state, the pain, when complained of, was referred to both temples equally; whereas the lesion found after death was situate in the posterior part of the right hemisphere. After the attack of coma, on the other hand, the pain was referred only to the right temple, while the anterior part of the right hemisphere was sound, and the posterior part, to which no uneasiness was referred, was the seat of a purulent abscess. A question, therefore, suggests itself, What caused the pain to be referred to parts which were found healthy, while that which was diseased was not the seat of any morbid sensation? Are we to regard the brain itself as insensible to the stimulus of inflammatory irritation, and, while one part is under this irritation, the morbid sensation excited in a remote part rather of the membranes than of the brain itself?

It is not easy to ascertain the time occupied in the production of suppuration. That process was perhaps beginning or going on on the 20th of February, at the period of the attack of coma and convulsions. It must nevertheless be admitted, that of this influence we have no positive or unequivocal proof. The increased severity of the symptoms, as indicated by the attack of coma, might have been produced by an increased extension, or a more violent degree of the inflammatory action. The only symptom indicating commencing suppuration is the fact, that the patient had occasional rigors during the night of the 22d,—the second day, or about forty-eight hours after the accession of coma. It is probable, therefore, that suppuration had commenced, and was proceeding at this time; and, as the fatal event took place on the 6th of the ensuing month, or twelve days after, it results that the time occupied was atleast twelve days, perhaps thirteen or fourteen.

The cause of this twofold lesion it is impossible to determine. At one time I thought that there might be some connection between the gangrenous disorder of the lungs and the purulent collection in the brain. I thought that it was perfectly consistent for a gangrenous disorder of the lungs, where ulceration and an attempt at separation between the sound and mortified parts was going on, to give rise to the gradual formation of purulent matter, and that the purulent matter might be transferred, as it was formed by the veins, to the brain, and deposited in that organ. I have not been able, however, to meet with any very satisfactory confirmation of this conjecture; and I therefore leave it in this problematical shape.

If the view now given were well founded, it might be a question to what extent we are to regard the suppurative collection as preceded by inflammation, or simply the effect of progressive transference and deposition; and perhaps the slight symptoms by which the formation of matter was preceded, are to be viewed as some confirmation of this view.

The case is nevertheless important in two respects; *first*, as showing the mutual influence which lesions in the brain and lungs exert in obscuring the symptoms of each other; and, *secondly*, as illustrating the progress of suppurative inflammation of the brain.

Case II.—Anne M'Call, aged 25, was admitted into No. 16. on the 27th of April 1840, with symptoms supposed to denote the presence of continued fever. About a fortnight previously, she was affected with nausea and vomiting, slight headach, loss of appetite and much thirst; seven days after she was first confined to bed, complaining of feelings of weakness and debility, with a good deal of cough, but no pain in the chest. Before her admission, she took two doses of castor oil, which operated well.

On admission, she complained of pain in back and shoulders; she had a good deal of cough, but without any expectoration; the bowels were reported open from the medicine taken last night. The tongue was foul and coated; the pulse frequent. Blood was drawn from the arm to twenty ounces.

28th. Blood drawn to twenty ounces slightly buffed; complains still of sickness; countenance flushed; five motions; pulse 108; tongue covered with a viscid yellow fur; complains of epigastric pain and uneasiness.

*Fiat venaesect. ad* ℥xii. *Sum. Bol. Jalap. Comp. c. Calomelanos* gr. vj. *Cras mane Haustus Cathartici* ℥iv.

29th. Blood was drawn to twelve ounces. Considerable sickness, but no vomiting took place; the countenance much flushed; she has had no sleep; pulse 116.

*Imponatur Vesicat. supra regionem epigastrii; Cap. etiam Pulv. Rhei Compositi* ʒi.; *et habeat cras mane Haust. Cathart.* ℥iv.

30th. Had some sleep, and feels to-day better; and countenance less flushed; 6 motions; pulse 120; the blister rose well; tongue covered with a yellowish fur, but moist at margins.

*Cont. medicamenta; cap. pil. Colocynthidis duas et cras mane Ol. Ricini* ℥i. *Mist. Salin. Ammon.* ℥i. *h. q. secund.*

May 2d. In consequence of sleep continuing, and the patient appearing to be a little comatose, a blister was applied to the head, which rose well. To-day, she is rational, but very deaf; the eyes are suffused; pulse 104; tongue covered with a rough yellow fur; two motions. *Cap. Calomelanos* gr. vi. *Pulv. Jalap.* ℈i. *in thereacea, et repet. c. m.*

3d. Had a restless night; is very deaf, listless, and a little stupid; some subsultus; no complaint; the tongue cleaner; three motions; pulse 88, very feeble.

℞. *Tart. Antimon.* gr. ii.; *aq. fontan.* ℥ii. *Sol. Mur. Morph.* ʒiii. *M. Cap.* ʒi. *h. q. tertia. Intermittatur Mistura Salina Ammoniata. Habeat cras mane Ol. Ricini* ℥i.

4th. Four motions; tongue gray, viscid, and moist; more sensible but very deaf; pulse 100, full and less oppressed.—*Cont. Solutio Antimonialis Opiata. Cras mane Haust. Cath.* ℥iv.

5th. Had a restless night; countenance flushed; eyes still watery and suffused; tongue dry, and yellow in centre, moist at margins; pulse 96, rather feeble; eruption fading; four motions. *Cap. Pulv. Rhei Comp.* ʒi. *cras mane Haust. Cath.* ℥iv. *Cont. Solutio Antimonialis Opiata.*

6th. Tongue still furred. *Cras mane Haustus Cathartici* ℥iv.

7th. Had a good night, with sleep; five motions; pulse 108; tongue moist, clearing at margins and apex, but covered in the centre with a moist gray fur.

*Habeat cras mane Haust. Cathart.* ʒiv. *Omittatur Solutio Antimonialis Opiata.*

8th. Four motions; tongue moist, but still a little furred; deafness rather abated; pulse 108. *Cras mane Pulv. Jalap. Comp.* ʒiss.

9th. Three motions; had a good night; pulse 108 to 112; countenance clear, but a little flushed; deafness abated; tongue yellow and moist, but complains of soreness of the right side of the organ, which is swelled and indurated. *Pulv. Jalap. Comp.* ʒi. *Cras mane Ol. Ricini* ℥i.

℞. *Subborat. Sodæ* ʒij. *Aq. fontan.* ℔j. *Solve. Fiat lotio linguae admovenda.*

11th. Cough has been very troublesome during the last two nights; pulse 136, small and oppressed; a good deal of frothy expectoration; countenance flushed; tongue a little furred; four motions. *Detrah. sang.* ℥x. *vel* xii. *de regione inter scapulas. Cont. Sol. Antimon. Admoveatur Vesicatorium sterno.*

12th. Blood drawn from the chest only this morning, and cough has been very troublesome during the night; respiration and voice resonant on both sides of chest in subscapular regions behind; respiration bronchial, and accompanied with bronchial rattles opposite the large tubes; percussion natural towards spine, dull in subaxillary regions and at lower angle of right scapula; blister rose well; pulse 108, small and oppressed. *Fiat venæsect. ad* ℥xii. *v.* xvj. *prout vires ferant. Cont. Sol. Antimon. cras mane Ol. Terebinth.* ℥i. *forma haust.*

13th. Blood drawn to sixteen ounces without faintness, covered with a thin buffy coat; respiration altogether bronchial on the left side, and accompanied with sibilous wheeze during expiration, which is rather short; respiration 24; the voice is very resonant in the right subscapular region, and accompanied with faint mucous rattle. Cough continues, with much foul dirty-coloured mucous expectoration, part floating. Countenance still flushed. *Admov. vesicat. supra pectus dextrum. Repet. venaesect. ad.* ℥xii. *v.* xvj.

14th, Blood was drawn to sixteen ounces, one cup presenting a buffy coat of a deep orange colour not cupped. Cough less frequent and urgent, but expectoration continues the same, with fœtid offensive smell. Pulse 112; countenance much less flushed and more natural. The tongue is covered with a gray fur. The breath is not fœtid; but an offensive smell issues from some part of the body, and is more perceptible at the distance of two or three feet from the bed than close to her person. *Cont. Solutio Antimonialis Opiata.*

16th. Had some muttering during the night; expectoration has the same characters. The same fœtid smell continues to be exhaled from some part of person. The tongue is yellow, but the breath does not exhale a fœtid odour. Cough continues, but is less urgent.

℞ *Pulv. Myrrh* ℈i. *Carb. Ammon.* ℈i. *in partes* x. *divid. una quater in dies sumenda. Cont. Sol. Antimon.*

17th. A restless night; but states that she is better; no pain; has expectorated opaque dark-coloured matter; fetid smell continues; the countenance is pale and the features are contracted; and the expression is haggard and ghastly; cough continues; pulse 120, small.

*Hab. Vin. Rub.* ℥ii. *horis sing. donec* ℥xii. *sumptae fuerint. Omit. alia.*

18th. Vomiting continued to recur at intervals, and weakness increased till half-past twelve this morning, when she died.

Inspection of the body on the 20th disclosed the following appearances.

The left *pleura pulmonalis* was universally adhering to *pleura costalis*, and also to the diaphragmatic pleura, and to the left margin of the pericardium. In detaching the left lung from the pleura, part of the posterior surface of the lower lobe gave way in three points, leaving irregular apertures leading into a large cavity in the substance of the lung. A considerable quantity of fœtid mucus, slightly ash-coloured, was found in the bronchial tubes of the lower lobe; and, upon making a longitudinal incision of the whole lung, the upper lobe was found to be occupied with gray-coloured hepatization, and the lower lobe presented a cavity irregular and oblong, but as large as a lemon, containing a quantity of ash-gray coloured matter, and lined with a gray-coloured false membrane, and with its interior very ragged, soft, and fetid.

The right lung also adhered to the *pleura costalis*, though less extensively, being chiefly in the posterior and upper part of the lung; but it was found to contain a still larger cavity; and when it was divided by an incision, this was found to occupy a great part of the upper lobe, containing a small quantity of ash-coloured dirty matter; the cavity itself was irregular, consisting of several small divisions; these caverns were lined with false membranes, and traversed throughout with cords and filaments, the remains of bronchial tubes and blood-vessels.

The lower lobe of the right lung was solidified.

The kidneys were fawn-coloured and flaccid, the exterior surface slightly mottled; and in the left kidney there was a small quantity of gray-coloured soft matter.

The heart was rather flaccid and pale, but not diseased, except in the mitral valves, which were thickened and opaque.

A slight steatomatous deposit was observed at the origin of the aorta.

The brain was healthy.

*Epicrisis.*—In this case the patient was brought to the hospital with symptoms believed to indicate the presence of continued fever; and, so far as reliance could be placed on the usual assemblage of symptoms, with the eruption, there is reason to think that she actually was labouring for several days, that is, from the 27th of April to the 9th of May, under this distemper. The leading symptoms during these twelve days were headach, tendency to stupor, anorexia, and sickness, thirst, epigastric tenderness, and pain; the tongue at first loaded with a moist viscid fur, which afterwards became rough and dry, and great feebleness. On the 4th of May, that is, the seventh day after admission, perhaps the fourteenth or the twentieth after the first symptoms of indisposition, the eruption was observed to be fading, and she was showing a greater degree of sensibility than she had done for two or three days. Two days after she was still more collected; but one unfavourable symptom remained in the pulse, which had risen from 90 and 96 to 112. She was in other respects, however, so much better, especially in the complexion, physiognomy, and the eye, that no report was thought requisite. On the 10th, the pure febrile disorder seemed to be subsiding.

It must be observed, nevertheless, that this woman had cough at admission, though without pain in the chest, or any expectoration; and though this symptom did not increase till the symptoms of fever were subsiding, it is not reasonable to think that the state of the lungs, on which the cough depended, was in any mode materially improved. As she was labouring under fever, the chest was not examined by auscultation till the 12th, when it was supposed the febrile state was much gone. On the 11th, nevertheless, it was impossible to doubt, from the urgency of the cough, the frequency of the pulse, and the respiration, and the state of the sputa, that she was labouring under an inflammatory and congestive state of the lungs; and though, recovering as she was from fever, and in a state of extreme feebleness, there was little encouragement to employ active depletion, still, as it seemed that the pulmonary symptoms could not be alleviated without evacuation, blood was cautiously drawn from the arm, and other means calculated to produce relief were employed, in the idea that the disorder was bronchitis ensuing on fever, as often happens in this city.

The obstinacy of the pectoral symptoms, however, and the foul appearance of the sputa, with the stethoscopic signs on the 13th, showed that we had to contend not with an ordinary disorder of the lungs; and the fetid offensive smell exhaled by the person of the patient on the 14th put the nature of the complaint beyond doubt.

I must here mention, that, though the latter symptom is not noticed in the reports of the case till the 14th of May, I was sensible of it several days previously. I think so early as the 10th

I felt it distinctly in the middle of the ward, and more so at four or five feet from the bed, than at the patient's person. Neither, indeed, the person nor the breath emitted, when she was approached, any foul or offensive odour; and this circumstance made me doubt whether I was correct in referring the offensive smell to this individual; and, consequently, I did not record the fact as a symptom until I was assured that I could not be mistaken, by the concurrent testimony both of my clerks, Dr Roberts and Dr Orr, and by that of other gentlemen who were in the habit of attending the hospital.

In this case the gangrenous lesion was not, as is usually observed, confined to one lung, but had affected both. In the left lung the gangrenous excavation was less extensive than in the right lung, and it was in some degree circumscribed. In the latter it had produced complete destruction of the greater part of the upper lobe. The gangrene was mostly diffused in the right.

This case seems calculated to throw some light on the question, whether gangrene of the lungs is to be regarded as a disease always essentially and originally gangrenous, or as one of the ultimate effects of the process of inflammation. In the left lung a considerable portion, surrounding and contiguous to the gangrenous part, was granular, inelastic, solidified, and hepatized; and it may be from this inferred that the portion affected with gangrene had been previously in the same state of solidification. At one time I was disposed to believe that it was not necessary that a gangrenous portion of the lung should be previously in a state of inflammation and solidification, but that it passed suddenly and originally, without intermediate stage, into the state of gangrene; in other words, that gangrene of the lungs is either a peculiar affection distinct from inflammation, or, like some of the other sphacelating diseases, is originally and essentially a gangrenous inflammation. I am disposed to think, both from the appearances disclosed in this case, and from those found in others since that time, that this opinion is not well founded, and that gangrene of the lungs may be one of the terminations of pneumonic inflammation, in peculiar habits, and under certain circumstances.

The appearances of the two lungs in this case, but especially of the left, first suggested to my mind the following conclusions.

It was by no means likely that the pneumonic disorder, which proved afterwards to be gangrene, had commenced on the 10th or 11th, when the cough and expectoration were only renewed in a more urgent and manifest form than previously. To have inferred that it had commenced only then, would have been to have assigned it a period of duration too short for such a process, so far as we are entitled to reason from the course and duration of analogous cases. It is much more probable that, at whatever time it had commenced, it had been proceeding steadily, though in a latent form, the whole time during which the febrile symptoms were proceeding, and had probably been somewhat advanced even at the period of admission. It is not indeed, improbable, that a latent pneumonia had been present from the first; and I regret that, in consequence of the apprehension of the presence of febrile symptoms, and the effect of contagion, I did not at first examine the patient by auscultation, in order to place this beyond doubt. It is even possible that the disease might from the first, and throughout, have been latent pneumonia, and that the febrile symptoms may have depended on the pulmonary inflammation; for the diagnosis between pneumonia, and fever with pneumonia or bronchial symptoms, an affection very frequent in Edinburgh in the winter season, is by no means easy. The febrile eruption was the only circumstance greatly at variance with this view.

Upon examining the structure of both lungs after death, it seemed impossible to admit that all the ravages then visible had been effected since the 10th or 11th of May.

The pneumonic induration itself must have taken several days, more probably some weeks, before it could have been so considerable in degree, or so great in extent. Upon examining carefully that portion contiguous to the gangrened parts, it appeared impossible to recognize the presence of any pervious blood-vessels. All were closed and lost in one uniform homogeneous mass of indurated lung. It appeared to me, therefore, that the part had been first consolidated by the exudation of the inflammatory products, and that all the blood-vessels had been compressed externally until they became impervious, and that, in consequence, one portion thus changed had been deprived of the materials of its nutrition, and had thus fallen into a state in which it was deprived of circulation and vital action.

This seemed the most likely explanation, from the circumstance of the lungs being contained within boundaries, with walls to a great extent unyielding and undilatable. As a consequence of this circumstance, when additional matter is infiltrated or poured into the interstices or substance of the lungs, the ribs do not yield, or do so in a very trivial degree; the parts so infiltrated being compressed so much more than usual, become as it were strangulated; and hence the closure of vessels, the impeded circulation, the extinction of vital power and action, and death.

That this lesion was not gangrenous from the commencement, but presented the usual symptoms of pneumonic inflammation, and only became gangrenous about the 12th or 13th of May, may be pretty confidently inferred, I think, from the general symptoms, and more especially from the expression of the countenance. In all cases of gangrene of the lungs which I have observed, the lesion has been attended with a most remarkable change in the expression of the countenance. The features become small, pinched, and contracted; the countenance is haggard and ghastly; the expression is miserable and death-like; the eyes sunk and void of lustre; and the patient is generally very feeble and languid; is squeamish; vomits from time to time; and becomes quite listless to all external objects. These symptoms may take place before the occurrence of the fetor of the breath and the surface, or at the same time with it, or after its occurrence. When they do appear, though common to many other diseases, yet here taken in connection with the state of the lungs, it is scarcely possible to mistake their signification as symptoms of pulmonary gangrene. In this case these symptoms did not take place till about the 15th or 16th days of May. Previous to this time the symptoms were those, first, of obscure or latent pneumonia, then of fever with pneumonia, and then more distinctly of pneumonia. It was not until the 13th or 14th of May that the features became contracted, the expression death-like, and the complexion earthy. From all these circumstances, together with those disclosed by inspection of the lung, I am disposed to think that this distemper was originally double latent pneumonia, which had assumed the gangrenous character, from the violence of the inflammatory action and the quantity of materials effused, thereby interrupting the circulation, and destroying the texture of the lung.

The kind of pneumonia, however, which takes this direction is peculiar, I must remark, in being much more chronic than the ordinary forms of that disease. It comes on more gradually, more insensibly, and, therefore, more insidiously. Most commonly, as it will appear in the sequel, the patient tells you he has had a cough the whole winter, or for some weeks or months; that, nevertheless, he has not been sufficiently ill to require to be confined, to take advice, or to use remedies,—at least more than a cough mixture; and, that it is only in consequence of the cough persisting, and perhaps some other symptoms having been at length added to it, as weakness, fever, sickness, and vomiting, or weight, pain, and oppression in the chest, that at length he applies for advice and assistance. It then results, that, in general, a most complicated disorder of the lungs is cognizable, that is, symptoms of bronchitis, symptoms of pneumonia, and symptoms of pleurisy, with various anomalous symptoms, all united at the same time, and one set not unfrequently obscuring and modifying the other. In this stage of the disorder, nevertheless, excluding those which I have now mentioned, there are no pathognomonic symptoms noticed, in short, distinguishing this as a lesion different from pneumonia, pleuro-pneumonia, or vesicular *bronchitis;* and it is only when the peculiar expression of the countenance and the colour of the collapsed features become manifest, with the offensive fetor of the person and breath, that the peculiar nature of the distemper is placed beyond doubt; and precise diagnosis, though scientifically interesting, is then, for all practical purposes, quite useless.

This idea of gangrene of the lungs being the result of previous pneumonia, and of pneumonia occasionally terminating in gangrene, though not favoured by Laennec, is, nevertheless, not new. Dr Bright, in the first volume of his Reports published in 1827, seems to consider gangrene as in all cases one of the terminations, though the least frequent one, of pneumonic inflammation; and among six cases of the lesion, which he records, he seems not to doubt that all had been preceded by inflammation. He indeed says, that "in some cases gangrene is the result of inflammation, so rapid in its course, as to be almost unattended by the usual symptoms, or at least they have passed nearly unobserved."* This observation, which is, doubtless, in some cases well founded, may afford some explanation of the general prevalence of the doctrine, that gangrene of the lungs is not preceded by inflammation;—that process being so rapid in progress and short in duration as to escape notice.

In 1822 and 1824, M. Andral met with two cases, which obliged him to draw the same conclusion; and when he published his work on Clinical Medicine, in 1835, he added a third from the practice of M. Recamier at the Hotel-Dieu.†

In the first of these cases in a man of 28, there was in the lower lobe of the right lung a cavity as large as an orange, with wrinkled brownish parietes, and exhaling a fetid odour; and around this cavity, the substance of the lower and middle lobes presented a mixture of red and gray hepatization.

In the second case, in a man of 22, there was near the middle of the apex of the left lung, not far from its external surface, a cavity large enough to admit a large nut, exhaling a fetid gangrenous odour, its walls lined with a thin layer of greenish matter, and beneath it the pulmonary tissue red and hard. The rest of the lung was hard and impermeable to air, of a grayish red colour, and traversed by numerous minute yellowish granulations.

In the first of these cases, M. Andral argues that the gangrenous attack succeeded to acute pneumonia, and in the second, to one of the most chronic forms of pneumonia which he had ever seen.

In the case given by the same author from M. Recamier, and which took place in a man of 55, there was found in the posterior part of the left lung, a very large cavity, filled with a putrid blackish sort of pulpy semifluid matter, amounting to more than half a pint, and of a very fetid odour. When this was removed, and the cavity washed with water, the cavity was found to be lined by a membrane, with many filaments and shreds, however, projecting from it. This cavity occupied so completely the whole substance of the left lung, that only a small portion of the pulmonic substance, about one inch and a half in size, was left at the apex of the organ, a small portion at the base of the lung, and a mere sac or coating of lung all round. The whole of this was in the state of gray hepatization.

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* Reports of Medical Cases, Vol. i. p. 136. London, 1827. 4to.

† Clinique Medicale, Pars II. Livre II. Section II. Chap. IV.

Cruveilhier has also been, by the same sort of evidence, compelled to admit the same conclusions. In 1833, he published, in the third and eleventh numbers of his work on Pathological Anatomy, two cases which, along with others, were well suited to illustrate the nature and origin of this lesion. In the first case, in number third, he adheres to the doctrine of Laennec, that there is a species of gangrene of the lungs independent of pneumonia; and he adduces as proofs of this the absence of the anatomical characters of pneumonic inflammation. Something in contradiction to this, however, he afterwards admits that gangrene of the lungs seldom takes place in persons in perfect health, and is usually preceded by bronchitis, or some similar pulmonary disorder.

In the eleventh number, however, is given a case of gangrene of the lungs, in the person of a soldier, aged 39, who had been epileptic from the age of 22; and from this he infers that gangrene of the lungs may ensue on pneumonic inflammation. "This proposition," he adds, "flows not from the anatomical fact of a thick layer of pneumonic induration inclosing on all sides the gangrenous portion; because the inflammation must be consecutive, in the same manner as the inflammatory circle which bounds the gangrene of a limb;—but is founded on the history of the disease, which presented all the clinical characters of a pneumonic attack manifestly inflammatory." He afterwards adds, that, though he does not deny entirely the occurrence of primary or idiopathic gangrene of the lungs, that is, gangrene unpreceded by inflammatory disorder, yet he believes it to be extremely rare; because, in the majority of cases, the general and local symptoms of gangrene were preceded by general and local symptoms of pneumonia.*

None of the cases recorded by the two latter authors appear to me to establish so clearly, as that which has been now recorded, the inference now mentioned. Not only do the history and course of the symptoms lead very directly to this inference, that the disease was originally an attack of pneumonia; but the whole of the appearances found in the dead body strongly corroborated the same view. If further confirmation, however, be wanting, I think it is furnished by one if not both of the two next cases.

This question is not, like some of those in pathology, merely a point of barren speculation not applicable to practice. It is, on the contrary, one of great importance in a therapeutic point of view. Were gangrene of the lungs always, as Laennec represents, to be an affection originally and primarily gangrenous, then treatment is either useless and unavailing, or antiphlogistic treatment is decidedly injurious and inadmissible. If, on the other hand, it be even in a certain proportion of cases only the effect of inflammation, then the means most likely to prevent the occurrence of the lesion must be those which abate inflammation and counteract its effects.

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* Anatomie Pathologique du Corps Humain, onzieme Livraison. Paris, 1833. Folio.

It may not be unseasonable to advert here to a circumstance, which may deserve future inquiry in an etiological point of view. The first decided case of gangrene of the lungs, which I saw about twenty years ago, in the body of a patient under the care of my late friend, Dr Duncan, took place while the system of the patient was under the influence of mercury, which it had been ascertained he had been taking, for some weeks, previous to the attack of pulmonary disorder. During this time, the patient, who had not means of taking much care of himself, worked at his daily occupation, was exposed to cold, and liable to be overheated, and continued to drink as much strong liquor as he could procure, upon the idea of supporting his strength, and enabling him to stand, as he expressed himself, the effects of the medicine. In the midst of this course of mercurial treatment and spirituous excitation, after suffering from cough and occasional short breathing, he was attacked with symptoms of debility and breathlessness so great, that he was obliged to apply for immediate admission. I do not now remember all the particulars of the case, or how long a time elapsed between the establishment of urgent symptoms and death. But the haggard countenance and fetid breath showed what was the nature of the case; and upon inspecting the body, the lower half of the right lung presented a most distinct and well-marked specimen of gangrene. It consisted of a uniform soft, dirty ash-coloured, pulpy mass, exhaling a fetid odour; and a pretty distinct line of demarcation separated it from the upper sound portion of the lung. Upon making a longitudinal incision, the same distinctness of boundary was perceptible in the substance as on the surface of the lung.

The occurrence of this attack of gangrene of the lungs, while the system was under the influence of mercury, suggested to me the inference, that charging the system with mercury might, in the case of pneumonic inflammation induced under such circumstances, give that inflammation the gangrenous tendency; and though it would be too great a generalization to establish, from a single case, the conclusion, that mercurial impregnation of the system disposes to gangrene of the lungs, I think I have seen some reason to think the conclusion is not unfounded, in various other cases of this distemper.

It appeared upon inquiry, that the woman Goodall, who turned out to be little better than a public female, had been taking mercury some time previous to her admission into the hospital. The subject of the second case was wife or mistress to a soldier, who her sister stated, treated her badly in various modes ; and they, had, therefore, been living separately some time ; and at other times when she was living with her husband, she was not allowed to approach either her mother or sister. She had become ill, and had taken various medicines which made the mouth sore ; and it was during this time that the pectoral disorder, for which she was sent into the hospital, was induced. She was also much addicted to the use of spirituous liquors.

So far as it was possible, therefore, to obtain information on this point, it seemed certain that both of these females had been pretty liberally drugged with mercury ; and when we consider the peculiar influence of this mineral in causing excessive action, or inflammatory action, or rather in inducing that state of over-distension and excitement of the vessels, which renders the parts no longer able to endure it, but causes them to give way in ulceration, phagedenic action and sloughing, it seems by no means unnatural to think that it may cause this sort of death in organs highly vascular, easily susceptible of violent inflammation, and, above all, confined within cavities, the walls of which, being undilatable, cannot yield to make room for the increased size and distension of the organ, resulting from the deposition of new matter.

This inference, however, I submit in the shape of a problematical conjecture, to be verified or disproved, as further experience may justify. It is important to observe, however, that it is not contradicted by the two next cases. The third case illustrates very well the mode in which the disorder makes it approach, as well as the complicated character which it presents.

Case III.—Dugald Fisher, aged 37, was admitted into the Royal Infirmary on the 16th April 1840, with symptoms of disorder of the chest of considerable severity.

He had been labouring under cough, with occasional difficulty of breathing, the greater part of the previous winter, and, in consequence of these symptoms and bodily weakness, he had been unable to work steadily at his occupation, which was that of a coach-carpenter. Between the beginning and the middle of March, the cough increased in severity and became more constant, and was accompanied with expectoration of clear thin fluid, moderate in quantity, but, according to the statement, without any feeling of pain in the chest. These symptoms continued till the 10th of April, when he was attacked one morning before breakfast with squeamishness, and soon vomited a quantity of greenish-coloured sour-tasted fluid. He was at the same time affected with fixed pain in the left side of the chest, most severe in the subaxillary region, extending thence in different directions, and continuing without interruption from that time to the present.

On admission he complained much of pain in the left side of the chest, impeding respiration, and preventing him from taking a full inspiration. This pain was represented to be confined entirely to the lower and middle part of the left side of the chest, at the convexity of the ribs; and over the same space the sound emitted on percussion was very dull, and considerable resonance of the voice was heard, while the sounds of respiration were indistinct. At the anterior part of the same space the crepitous rattle was heard. Cough and expectoration continued, and the matter expectorated was viscid and jelly-like, but not rusty or orange-coloured. The tongue was coated with a thick yellowish fur. The pulse was frequent, between 100 and 120, a little sharp; and the bowels were confined.

Sixteen ounces of blood were directed to be drawn from the arm, and he was directed to have immediately a drachm and a-half of the compound jalap powder, and next morning four ounces of the saline infusion of senna.

The blood drawn to the amount desired was buffed and cupped; the pain of the left side was very much relieved, though not gone; and the cough was less frequent and urgent; but the dulness of the lower part of the chest upon percussion, and the resonance of the voice continued.

He was directed to take every third hour two drachms of a mixture containing four grains of tartrate of antimony, and two drachms of the solution of muriate of morphia, in two ounces of water.

On the 18th of April he had slept well, and was much less disturbed by cough, which was abated; the pulse continued at 120, and he was disposed to perspire about the head and neck. The expectoration consisted chiefly of jelly-like mucus, with frothy saliva, but without any rusty colour. The dulness upon percussion continued in the space already indicated, with total immobility of the chest, and the respiration was altogether abdominal. The voice was very resonant in the left subscapular region downwards.

The blood-letting was directed to be repeated as his strength would allow; and if the pain of the chest were not relieved, ten ounces of blood were directed to be drawn from the subscapular region by cupping. The opiate antimonial solution was continued, and an ounce of castor oil was directed to be taken next morning.

19th of April. The blood had been drawn from the arm to the extent of sixteen ounces, and was found much buffed and strongly cupped; and, as the pain of the chest was not relieved, twelve ounces of blood were drawn by cupping from the subscapular region. This had the effect of relieving the pain, so that he did not afterwards complain of uneasiness in the left side; but slight and indistinct œgophony was recognized about one inch and a-half from the spine on the left side. The pulse was 112, softer; the castor oil had been rejected by vomiting; and the tongue was furred.

Two compound colocynth pills were directed to be taken and repeated to the fourth time, and the opiate antimonial solution was intermitted.

On the 20th, he was asleep at the visit, but perspiring profusely over the head, neck, and chest; respirations were about 20 in the minute; he complained only of weakness; the matter expectorated was opaque, jelly-like, and slightly orange-coloured. A blister was applied on the left side of the chest; the opiate antimonial solution was resumed; and an ounce of oil of turpentine was directed to be given next morning.

On the 21st, the blister had risen well, and perspiration had been less profuse. He now complained, however, of pain in the right subaxillary region. Respiration was bronchial, but performed with a duller sound than usual in the same spot. The pulse was 108. Ten ounces of blood were ordered to be drawn by cupping from the right subscapular region.

On the 22d, when blood had been drawn from the part to the amount ordered, the pain of the side of the chest was rather worse, and it was aggravated by deep inspiration. Percussion elicited a preternaturally clear sound over the whole of the right subaxillary region, and downwards to about two inches from the lower margin of the chest, and crepitous rattling was heard all over the lower part of the right side of the chest, most distinctly during expiration, with a sort of rough friction sound. The respiration was almost entirely abdominal, 30 in the minute, with very little movement of the chest; and he lay entirely on the left side. The sound elicited by percussion behind was much duller than laterally. The pulse was 116, and small. He had been very cold all night, and had a great deal of hiccup. The tongue was covered with a yellowish rough fur, and the bowels had not been moved much since the 21st.

Blood was ordered to be drawn from the arm to the amount of 16 or 18 ounces, afterwards an opiate of two scruples of the morphia solution, and a purgative enema with one ounce of oil of turpentine to be administered. The antimony was stopped.

23d. Only four ounces of blood could be drawn, which was much buffed and cupped. Enema was followed by three motions. The pain became much easier, but the hiccup continued unabated. The pulse was 96, sharp and wiry; and the tongue continued covered with a yellow moist fur. Respiration was totally inaudible in the lower part of the right side of the chest; percussion elicited a duller sound than yesterday; and nothing was heard except the beats of the heart. The voice was not resonant.

Six grains of calomel, six of colocynth, and ten of jalap in treacle were ordered; to be followed by a turpentine purgative enema if the bowels were not freely moved. One drachm of the solution of muriate of morphia was ordered to be given at the hour of repose.

24th. A good deal of vomiting had taken place, but hiccup was less frequent. The pulse was 116. The tongue covered with a white fur. He had no abdominal pain, and the belly bore pressure well.

He was directed to take six grains of calomel with half-a grain of opium; and to be repeated if vomiting continued; an enema in the evening.

25th. He had two motions before the administration of the enema, and after that four scanty motions, distinctly feculent, and partly consistent amidst fluid matter chiefly of an orange-yellow colour. Hiccup had not recurred since eleven at night; and he slept at intervals. He complained still of a sense of oppression referred chiefly to the sternum. The respiration was from 32 to 36, both thoracic and abdominal, but mostly abdominal; the moist crepitating rattle was heard at the posterior part of the left side of the chest, about two inches from the spine; and percussion elicited there a sound totally dull. There was occasional cooing sibilous noise during expiration. The voice was resonant at the lower part of the chest on the left side.

Six grains of calomel and half-a grain of opium were ordered, and afterwards two colocynth pills. A blister was directed to be applied to the posterior inferior part of the left side of the chest; at bed-time an anodyne with half-a drachm of solution of muriate of morphia; and next morning a dose of castor-oil.

26th. Five motions took place, and the blister had risen partially; but the pulse was 112, very small; and the respiratory motions were very rapid. The features were contracted, and assuming a death-like expression.

Eight ounces of wine were added, and one ounce of the following mixture every hour.

℞. *Spiritus Ætheris Nitrosi* ʒii.; *Aquae Cassiae* ʒii.;
*Syrupi Citri Aurantii* ʒii.; *Aquae fontanae* ʒii. M.

27th. Spent a bad night from restlessness. Complete dulness on percussion in right subscapular and subaxillary region, with moist mucous rattle. The tongue was covered with a gray viscid fur. The pulse was 108, small. The countenance more contracted, and the expression more ghastly; and he is so weak that it is impossible to examine the chest fully.

Wine and mixture was continued.

28th. No report.

29th. He had some sleep; the respiration was still oppressed, 36 in the minute, and performed with much stifling. The pulse was 116, small. The fur on the tongue was viscid and yellowish.

Wine was continued; and an enema, with two ounces of oil of turpentine, was directed to be administered.

30th. He slept well till four A. M., when he was attacked with difficult breathing, which continued till the visit. Considerable rough sonorous rattling was heard in the lower part of the right side. Expectoration was slightly streaked with blood, and with the breath emitted a fetid odour. The pulse was 120, very small; and the aspect was ghastly.

Wine and mixture continued, and six ounces of calf-foot jelly ordered.

May 1st. He complained of great weakness and difficulty of breathing. The respiration was 36, with very strong sonorous rhonchus in the right mammary region, and a faint sibilous wheeze during expiration. Duller sonorous rhonchus was heard in the left mammary region with some mucous rattling. The pulse was 112, very small. He had this morning four ounces of wine additional.

Wine increased to ten ounces daily.

2d. The breathing continued to be short, frequent, and laborious, with great general feebleness; and death took place at four P. M. yesterday.

Inspection of the chest on the 5th disclosed the following phenomena.

Sixteen ounces of purulent fluid were contained in the cavity of the left pleura, thick, homogeneous, opaque, and cream-coloured. Two-thirds of the lower part of the pulmonic pleura adhered to the costal pleura, by not very firm lymph; and the line of adhesion was distinctly marked, red, and vascular. The upper third of the pleura was inadherent. A tubercular hard mass, about the size of a walnut, was situate in the upper part of the left lung. Below that the lung was slightly solidified (hepatized,) and effused much reddish serum from divisions of its substance, which was granuliform and lacerable.

The whole posterior part of the lung, to the extent of 10 or 12 inches, was of an ash-gray colour, soft and pulpy, completely lacerable, and emitting a fetid odour; and, when subjected to a stream of water, the greater part was removed by washing, leaving only bronchial tubes, blood-vessels, and ragged filaments of lung.

A view of the state of the parts in the posterior region of the left lung is given in Plate I.

In the cavity of the right pleura were contained twelve ounces of sero-purulent fluid, the supernatant being thin, green-coloured, semitransparent, and whey-like, and that below thicker and more opaque. A large quantity of soft lymph was spread over the lower portion of the pulmonic pleura, interposed between, and connecting it to, the costal pleura, but not firmly, and extending from about the middle of the upper lobe downwards to the base of the lower lobe. A small hard tuberculated nodule was seated in the apex of the upper lobe of the right lung; and below that, the substance of the lung was solidified, and its substance, which was granuliform and lacerable, effused, when divided, serous fluid in abundance.

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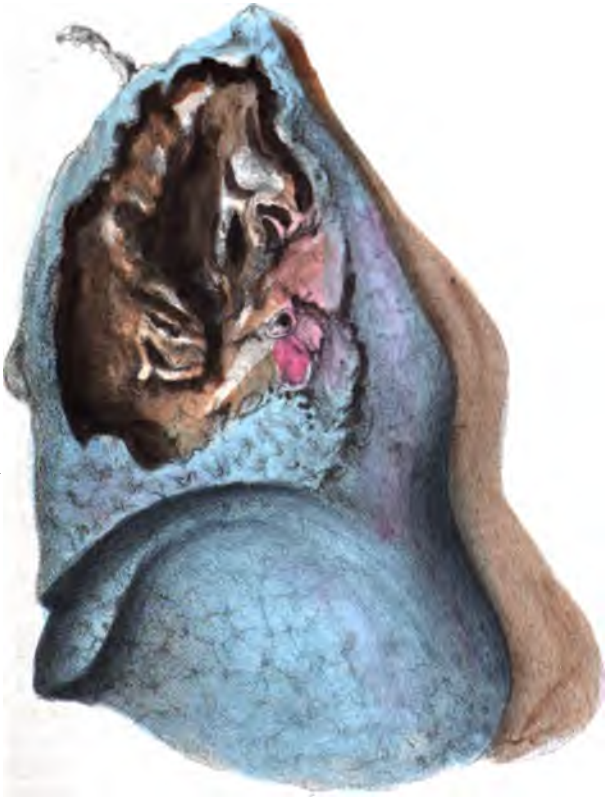
PLATE I.



Diffuse Gangrene of the Lungs.

The mucous membrane of the bronchial tubes connected with this lung was very much reddened.

*Epicrisis.*—In order to understand the nature and course of this complicated case, I think it is requisite to distinguish three periods of the disorder. The first is that which took place previous to admission, and the 10th of April, and which, I think, the history of the symptoms, the actual symptoms at admission, and the appearances disclosed by dissection, warrant us in inferring was pneumonia and pleurisy of the left lung, affecting the lower part of the upper lobe and the whole of the lower lobe. The second is that which extended from the 10th of April to the 21st of April, when he was attacked with symptoms of pleurisy of the right side. And the third period is from that time till the fatal event —a space of eight or nine days.

The whole time between the date of admission and that of death was only sixteen days. The first period was evidently the longest, and, so far as the statement of the patient could be trusted, occupied between four and five weeks. The second period was about ten days; and the third, as already stated, was eight or nine days.

1. At the time at which the patient was admitted, his symptoms were those of pleuro-pneumonia of the left side. The presence of the pneumonic affection was indicated by the cough, the expectoration, the crepitating rattle, and the resonance of voice in the middle part of the left side; all of which seemed to show that the lower part of the upper lobe and the upper part of the lower lobe were beginning to be indurated or solidified. It is probable that this disease had been proceeding for some weeks, perhaps the whole of the four weeks previous to admission, during which he had been unable to work. But it is further likely that the disease had commenced, and was proceeding some time previous to this, as it was afterwards ascertained that the patient had been labouring under cough, and occasional difficult and constrained breathing the greater part of the winter, and had been less able than previously to work at his occupation, namely, that of a coach-carpenter.

One symptom generally present in pneumonic inflammation was wanting in this case till the 20th of April, that is, four days after admission. This was the rusty or orange-coloured aspect of the sputa. Previous to this the matter expectorated was viscid and jelly-like, but not rusty-coloured. The absence of this symptom, however, was not material, as it is occasionally wanting in the commencement of the disease, and especially if antiphlogistic measures be employed.

But, besides the pneumonic, there was pleuritic inflammation; and it was manifest that this caused the pain of the left side, the dull sound elicited by percussion over the convex part of the left subaxillary region, and the diminished mobility of that part of the chest. This inference was also clearly established by the appearances of the left lung on inspecting the body after death; for it was found that the whole of the lower portion of the left pulmonic pleura was united by a layer of loose soft coagulable lymph to the costal pleura, while a considerable quantity of purulent matter was found in the dependent portion of the cavity.

The gangrenous affection, which was confined to the left lung at its posterior part, must have been going on probably at the time of admission, or soon after that event; and, I think, a strongly corroborative proof of this inference is found both in the pleuritic inflammation, which the symptoms showed were established at the time of admission, and also in the appearance and extent of the parts destroyed by gangrene, as shown after death. The reasons for this opinion are the following.

In most, perhaps all instances of gangrene of the lungs, if pleuritic inflammation have not previously taken place and given rise to adhesion, it takes place as an effect of gangrene. It is then partly an effect of the irritation of a violently destructive action, and partly one of the means employed by nature to counteract the progress and effects of the gangrenous destruction. While, indeed, intense inflammation of the lungs may give rise to gangrene, the latter in its turn gives rise to inflammation; and as, when a portion of the lungs is attacked by gangrene, it is likely to come near the surface, or the pleural covering, the inflammation of that membrane is almost a necessary result. In some instances, even I have observed that in circumscribed gangrene, which commonly takes place near the surface of the lungs, a definite eschar as large as a shilling or a half-crown-piece, has dropped off, and left a cup-like cavity on the surface of the lung, but penetrating some depth into its substance, and all round much albuminous exudation in both divisions of the pleura, and some sero-purulent fluid in the cavity.

In the case now under consideration there was gangrene of the whole posterior part of the left lung; and this, which it appeared to me had commenced, and been proceeding previous to, or at the time of admission, had induced the pleuritic inflammation of the convex lateral and anterior part of the pleura.

2. The pneumonic inflammation had been proceeding in a chronic and latent form for four weeks previous to the 10th of April. At this time either the pneumonic inflammation itself, or rather its transition into gangrene, had given rise to pleurisy of the left side. This circumstance, therefore, should mark, I think, the commencement of the second stage.

It cannot, in opposition to what is now stated, be argued, that the gangrenous affection ought to have evinced its presence by distinct and unequivocal symptoms; and that there is no ground to infer the presence of this disorder, without the manifestation of distinct symptoms. The truth is, that it is not easy to specify the pathognomonic symptoms of gangrene of the lungs in the early and incipient stage of the affection; and it may be doubted whether there are pathognomonic symptoms. The two mentioned by Laennec, viz. the fetor of the breath, and the fetor of the expectoration, evidently do not take place till the disorder is far advanced, and the patient is approaching the fatal termination of his disorder. This circumstance, indeed, led Dr Bright, several years ago, to infer that it was only when a communication was established between the gangrened part and the bronchial tubes, that the breath and expectoration became fetid; and I am confident that, so far as my own observation of this disorder extends, this inference is both reasonable and founded on observation. It was only on the 30th of April, the day before his death, that the expectoration and breath emitted a distinctly fetid odour; and it is to be observed that, at the same time, there were distinct stethoscopic indications of the presence of a newly developed bronchial disorder in the left lung,—evidently attributable to the fetid and bloody matters proceeding from the part gangrened into the bronchial tubes.

3. The third period of the pulmonary disorder of this man seems to be indicated by the developement of a peculiar disorder of the right side on the 21st of April, only the fifth day after admission.

For the origin of this attack it is difficult to account, nor is it easy to perceive any connection between it and the gangrenous affection of the left lung. At the commencement of the attack, in consequence of the clear sound emitted by percussion in the subaxillary region and downwards, I was disposed to ascribe it to the rupture of a cavity either tubercular or gangrenous, and the escape of air and bloody serum and mucus into the cavity of the pleura. In the course, however, of twenty-four hours, the sound emitted by percussion became much less clear, and eventually it became almost as dull as on the opposite side, except at the axillary region, where it continued clear. Behind that, or at the most dependent part of the right side of the chest, the sound was dull from the commencement,—a circumstance which was rather favourable than opposed to the idea, that the pleuritic attack of the right side had been induced by perforation.

Another symptom of considerable importance deserves some notice in this place. With the presence of pain in the right side, the unusually clear sound emitted by percussion in the subaxillary region, and the smallness of the pulse, there was heard by auscultation a distinct and strong crepitating rattle with large bells, that is, as of the sound of a fluid moved to and fro by the motions of respiration, and agitated with air. This sound was very similar to the fluid gurgling heard over one or two large tubercular cavities not emptied, and consequently to which air has not procured free admission. This idea, however, was rendered very unlikely by the position in which the sound was heard, cavities being very rare in the lower part of the lung. The sound was, as it might be called, dull; and gave the idea of little or no air being in the part where it was formed. It was not, however, the crepitating rattle of pneumonia; for it was both louder and evidently produced by a larger assemblage of fluid than ever attends the effusion taking place in that disorder.

From the other symptoms with which this was attended, I was compelled to infer that, as it was produced neither by pneumonic effusion, nor by tubercular cavities, it was the result of the presence of sero-purulent fluid within the pleura; but, as it seemed unlikely that this rattling sound could be produced without the presence of air, I was hence rather confirmed in my inference, that perforation might have taken place.

This opinion, however, was not confirmed by the state of the pleura disclosed by dissection, which showed that the dulness behind was caused, as it usually is, by the effusion of sero-purulent fluid; and that the pain must have been the result of mere inflammation, while the clear sound emitted by the axillary and subaxillary regions was owing to that part having at first escaped inflammatory action, and only becoming involved in it at a late period of the disorder. The lung also was not collapsed,—a circumstance which always ensues on perforation.

With regard to the symptom of the dull crepitating rattle with large bells, already mentioned, it is necessary to make one remark. I have several times heard this sound, and once or twice I have had opportunities of ascertaining that it did depend upon the presence of sero-purulent fluid within the pleura. At first I did not attempt to form any opinion as to its cause, because any attempt to do so was accompanied with a number of fallacies. In one case, however, of a female in the winter of 1837–1838, who died partly in consequence of fever and partly in consequence of pleurisy, and in which I heard this sound for three or four days previous to death, I traced it so unequivocally to the presence of sero-purulent fluid within the pleura, that, at least in this case, it seemed a just inference, that it could depend on no other cause. I would not attach any importance to one single case, had I not observed it so carefully, repeatedly, and distinctly in the case now under consideration, that I think it impossible that I could be mistaken; and I am therefore obliged to infer, that this peculiar crepitating rattle depends on the presence of sero-purulent fluid within the pleura.

I am not, however, prepared to say, that in all cases of sero-purulent fluid within the cavity of the pleura, this sound is heard; for I am satisfied that it is not heard in all cases. Neither am I prepared to specify the circumstances under which it is heard. I can only say that, when it is heard, it indicates, along with the other symptoms already specified, the presence of sero-purulent fluid within the pleura, perhaps in small quantity, and consequently denotes the early stage of purulent pleurisy or empyema.

The third stage of this man's disorder, which I have dated from the 21st of April, includes the changed appearance of the face and expression which took place on the 27th of April. I am only in doubt whether it might not be more properly dated from the period when hiccup and vomiting took place, viz. the 22d and 23d. The only reason rendering this questionable is the fact, that hiccup and vomiting do not take place in all cases of gangrene of the lungs, though they appear in a considerable number. Whatever view be adopted is perhaps not very material. After the 22d, it may be said the patient's fate was decided. The disease proceeded steadily to the fatal termination.

This case establishes the truth of the inference, that gangrene of the lungs is in several if not many cases preceded by pneumonic inflammation; fully confirms the observations which I already made regarding the difficulty of recognizing the presence of this lesion in the early stage of the disorder; illustrates the principle already stated, that at first it appears under the form of a severe and complicated, and often an insidious disorder of the lungs; and shows that it is only at a period when exact diagnosis is no longer of any practical use, that the true nature of the lesion becomes manifest.

It was also learned, as satisfactorily as can be expected in cases of this kind, that this person had been taking mercurial medicines during the early part of the winter, or rather in autumn, and that he had caught cold while under mercurial influence.

CASE IV.—Peter M'Laughlan, aged 33, admitted August 1, 1840, a wire-worker. This man stated, that, till about nine weeks previous to the date of admission, he had enjoyed good health. At that time he began to suffer from cough and breathlessness, sometimes accompanied with vomiting, yet without any pain in any part of the chest. The expectoration, however, was very copious, of a thick, viscid, and frothy nature, but never tinged with blood. He complained also of general weakness and debility.

On admission he stated that the breathlessness was generally worse at night and early in the morning, sometimes amounting to orthopnœa. The chest anteriorly was prominent, especially in both mammary regions. The shoulders were elevated and inclining forwards. Percussion elicited a preternaturally clear sound over both mammary regions, where there was an approach to a sonorous rattle. Crepitous rattling was heard posteriorly on both sides, but most distinctly on the right side of chest. Expectoration continued copious, viscid, and tenacious. He complained still of nausea and vomiting with thirst.

The respiration was from 24 to 28 in the minute, with considerable motion of the flanks and abdominal muscles. The pulse was 116 to 120, easily accelerated, full and strong, rather hard, especially in horizontal posture, in the erect it became smaller, but was still hard.

2d. Has suffered much from cough during the night. Percussion elicits a dull sound in right subscapular region, where respiration is inaudible, and crepitating rattle only is heard; respirations 24; pulse 116, small and sharp in erect position; fuller and harder in recumbent. The beats of heart are heard preternaturally clear on both sides. The tongue is pretty clean. *Fiat. ven. ad* ℥xxiv. *et statim postea habeat Haust. Anod. c. Sol. Morph. semidrachma; Abrad Capill.; Hab. Calomel.* gr. vi.; *Pulv. Jal.* ℈i. *in Thereac; postea Haust. Cath.* ℥iv.

4th. Blood drawn on the 2d to twenty-eight ounces; but cough continues troublesome. Yesterday, twenty ounces more were taken, all buffed and cupped. The breathing is at present more natural, and less oppressed; but cough continues troublesome; pulse 100, still hard. The expectoration is frothy, but not streaked with blood. The sound upon percussion is still dull in right subscapular region, and crepitous rattle is heard, but respiration is more audible. Dulness most distinct along the angles of the ribs, and below the scapula, and the voice is resonant along the same space. Cough continues so urgent as to interrupt sleep; but he can lie down in the horizontal position. The respiration is more abdominal than thoracic. *Rep. v. s. ad* ℥xx. *et Hab. post venaesectionem Haust. Anod. Ant. c. Sol. Morph.* ℈ii.

5th. Blood was drawn to thirty ounces; and was buffed and cupped; cough little abated, but expectoration much diminished in quantity; moist crepitating rattling, with large bells, continues in the right scapular, subscapular, and subaxillary region; the respiration was 22 to 24; pulse, 100; good strength; no pain nor sense of weight in side, or in any part of chest; tongue covered with a thin fur at base. *Rep. v. s. ad* ℥xviij. vel ℥xx.

℞. *Ant. Tart.* gr. viij. *Aquæ* ℥ij.; *Sol. Morph.* ʒiij.; *sumat drachmas* ij. *horâ qq. secundâ.*

6th. Blood was drawn to eighteen ounces, without producing faintness; breathing has been more free, and moist crepitating rattle much less intense; the cough less urgent; pulse about 100. *Cont. Sol. Ant. Opiata.*

7th. Cough abated, and breathing less difficult; expectoration less abundant, and comes away more easily; pulse 96 to 100; tongue moist, but covered with a yellow fur at base; much thirst. One bottle of beer. *Cont. Sol. Ant. Opiata.*

8th. Cough much the same, with expectoration of a good deal of frothy transparent mucus, but it comes up more easily; the breathing also less laborious; pulse 106; crepitating rattling, with large bells heard at inferior angle of scapula of right side, and more distinctly lower down, with little respiration; also in upper part of chest, in superior spinal fossa, where it is masked by crepitous rattling, and a creaking sound. *Detrah. sang.* ℥x. *de regione subscapulari.*

9th. Blood drawn to nine ounces by cupping; breathing easy, but cough is rather frequent; pulse 112. *Cont. Sol. Ant. Opiat.*

11th. Cough has been rather troublesome during the night; pulse 108, rather strong and full; tongue covered with a yellowish fur; considerable moist crepitating rattle, with large bells, is heard over the right side. Some resonance of voice about two inches below the right clavicle; and there is great dulness on percussion between the angles of the ribs and the lower angle of scapula.

*Rep. v. s. prout vires ferant; detrahantur sang.* ℥vi. *de regione subscapulari dextra.* ℞ *Calomel.* gr. vi.; *Pulv. Jal.* ℈i. *in Thereacea; cras mane Pulv. Jal. Co.* ʒi. *cum Carb. Sod.* gr. xv.

12th. Blood drawn to sixteen ounces from the arm, producing temporary faintness, thickly buffed and cupped; and six ounces from the chest by cupping. He had no sleep in consequence of frequent and urgent cough. Percussion continues dull on the space corresponding to the angles of the ribs behind the scapula on the right side. A good deal of resonance of the voice is heard in the space between the angles of the ribs and the scapula. Sibilous wheezing heard during inspiration, along with large crepitous rattling. Respiration 30, laboured and panting; pulse 116; several motions.—*Vesicatorium supra partem posticam pectoris dextri; Hab. Haust. c. Sol. Muriatis Morphiae* ℈ii.

14th. The blister rose well; but cough has been very troublesome and urgent. The pulse is 100, throbbing and full.

*Cont. Solutio Antimonialis Opiata.*

16th. One motion yesterday morning. Slept pretty well during the last two nights; but starts and mutters a good deal during sleep. Moist creaking rattle continues, with sibilous wheeze in the right subaxillary region, and backwards to the angles of the ribs, where respiration was almost extinct, and voice is resonant. Respiration 24, more abdominal than thoracic; pulse 124, thrilling and sharp, with a good deal of heat of the skin; much epigastric pulsation visible, and giving a general shock to the epigastric region. No pain in any part of the chest is complained of.

*Detrahantur sang.* ℥xii. *de regione subscapulari dextra vel admoveantur Hirudines* xvi.

17th. Blood drawn to half an ounce by cupping, and leeches bled freely. He slept ill, with frequent muttering during the night; cough continues troublesome; pulse 128; expectoration as before.

℞. *Pulv. Digitalis purpureae* gr. xii; *Opii* gr. iii; *Conf. Aromat. sq. s. Ft. Mass. in Pil.* xii. *dividenda, una ter in die sumenda Admov. Vesicatorium regioni subscapul.*

18th. The blister has risen imperfectly; the cough rather less urgent. Medicines continued.

21st. He expectorated a good deal of mucus tinged with blood, and also some pure blood; slept pretty well; respiration 28, with prolonged inspiration and distinct moist crepitating rattle in right subaxillary region, and backwards to subscapular; breath not fetid, nor does the expectoration exhale a fetid odour; pulse 108; muscular motion slightly unsteady; tongue furred.

*Pil. Col.* ii. *cras mane Ol. Ricini* ℥ss. Other medicines continued.

22d. Hæmoptysis continued rather more profusely, with fetid breath; has no pain; pulse 112.

*Ft. v. s. ad* ℥xii.; *Admov. vesicat supra pectus dextrum.*

23d. Died this morning at nine.

Inspection on the 25th of August disclosed the following appearances.

No fluid was contained in the cavity of the right pleura. One pretty firm adhesion was found connecting the costal pleura to the lung, from the middle to the apex, so that the whole costal pleura had to be taken out in removing the lung. When the lung was removed, there was found near the middle of it a loose, soft fluctuating spot, which gave to the finger the sensation of a quantity of fluid. This cavity approached very near the surface of the lung, at the upper and back part of the middle lobe.

A longitudinal incision was made, going quite through it from the apex to the base of the lung, through its most convex part, and this disclosed a spheroidal cavity as large as an orange, filled with a quantity of dark-coloured fluid, clots of grumous blood, and emitting a very offensive fetid odour.

When these clots were removed, the appearance of the lung and surrounding cavity was as follows. The surface of the cavity was very dark-coloured, as if it had been covered over with a mixture of dirty China ink, and covered with loose shreddy filaments, the remains of broken down lung. It was also very irregular, and presented several subordinate excavations. At one part, viz. the most anterior, that is, where it came nearest the surface of the pleura, the interior of the cavity was formed by a gray-coloured, shrivelled, but distinct and firm membrane, the surface of which was smooth and firm, and which was rather less than half of an inch thick. Portions of this membrane could be traced backwards and inwards into the internal part of the cavity, but it was there much less distinct. The whole of the lung around this cavity, especially towards the root of the lung, was firm, solid, and uncrepitating; that of the upper part of the cavity completely granular, and effusing large quantities of frothy serum; only one part at the apex and at the base crepitated. The lobes adhered by interlobular false membrane. This lung weighed two pounds eight ounces rid of the coagula, which amounted to about three ounces. The mucous membranes of the bronchial tubes were reddened and villous, and the tubes contained a considerable quantity of sero-mucous fluid.

The left lung when examined presented a considerable quantity of frothy serum in the bronchial tubes.

The kidneys were vascular upon the surface; and on making an incision, they were found to be penetrated by granular matter.

The mitral valve was thickened, irregular, and cartilaginous.

The semilunar valves were perforated by small holes.

The cavity in the right lung measured 3½ inches in the long diameter, and 2½ in the transverse.

*Epicrisis.*—I have already anticipated in my remarks on the previously-related cases most of the observations suggested by the one now given. Only a few points may be adverted to as important either in pathology, diagnosis, or treatment.

This case, I think, may be employed as confidently as the second one, in order to confirm the conclusion already stated, that pneumonic inflammation precedes and may terminate in gangrene. This inference is, I think, strongly corroborated, both by the nature and course of the symptoms during life, and also by the appearances disclosed by inspection. The disease presented at the time of admission all the characters of an intensely inflammatory disorder of the lungs, not quite acute, but certainly much less insidious and latent than any of the other cases. There were at the time of admission evident symptoms of inflammation and hepatization of the upper and middle part of the right lung; and the remedies employed to abate these symptoms were for several days effectual in doing so.

Upon inspection of the body after death, the right lung presented a most exquisite and perfect specimen of circumscribed gangrene taking place in the middle of inflammatory induration. The cavity, which was not less than an orange or pippin, was filled with the usual contents of gangrenous cavities, viz. blood, serum, fragments of broken down lung, blood-vessels, shreds, filaments, and fragments of truncated bronchial tubes. The cavity was bounded by, and contained within, a new membrane, evidently the result of inflammation; and besides this, the adjoining lung, both above, below, behind, and before the cavity, was all indurated and solidified in consequence of inflammation. The gangrenous portion was not, as is often the case, and as takes place in diffuse gangrene, insensibly and gradually lost in lung that was sound, or at least not much diseased; but it was at once strongly, clearly, and suddenly separated from the solidified lung by the former constituting a cavity representing, and left in place of, the destroyed lung, and by the latter presenting the usual characters and structure of simply red hepatized or solidified lung. There seemed, in short, in this large spheroidal cavity to be something peculiar and dissimilar to the usual characters of lung affected with circumscribed gangrene. In most of the instances of circumscribed gangrene, an eschar, definite in shape and limited in size, is formed of a portion of the lung,—often near the surface, and at length usually involving the pleura; and on inspection after death, the mortified portion is either found in its place partially detached, but still adhering, or it has dropped off and left, indicating its previous position and extent, a cup-like or hemispherical cavity, not unfrequently with the surrounding portion of the lung comparatively sound, and elastic, and crepitating, and with merely the immediate thin layer from which the eschar had been separated, firm and solid. In this case the dead portion of lung is at once thrown off; and it is still a portion of lung, deprived of vitality, dry, shrivelled, and hard.

In the variety of circumscribed gangrene here described a very different state of parts is recognized. No dead lung, no eschar, properly so named, is left or recognized. But the portion that is thus deprived of vitality, instead of being separated and thrown off in its original shape and size, is as it were utterly dissolved in a semifluid mass, not indeed, homogeneous, but still so far presenting homogeneous characters that it consists of a quantity of dark blood-coloured pulp, in which the integral constituent tissues of the lung can no longer be recognized. It seems as if the entire gangrened mass were melted down in a uniform solution.

It could scarcely be argued that the inflammatory solidification was in this case the effect of the gangrene. I shall endeavour to show that the part which in the right lung was found to be in a gangrenous state was so on the 3d day of August, and that the process of solution went on steadily and without interruption from this date till the period of the man's death. Now it must be observed that, had the inflammatory action been the effect of the gangrene, it must have gone on *pari passu* almost with it, and its symptoms must have been indicated at the same time. The inflammatory action, however, seems to have been either very far advanced or almost completed by this time; for all the general or rational symptoms showed that pneumonia had been going on for a considerable time, at least several weeks, and the stethoscopic symptoms as clearly indicated that considerable solidification of the right lung had been accomplished.

The symptoms of large crepitous rattling heard in this case from the 3d day of August in the axillary, subaxillary, and subscapular, regions, is a very important one. It was a sound exactly as if a large quantity of semifluid matter in a considerable cavity, not empty, but full or nearly so, had been agitated to and fro with a small quantity of air. It was indeed a moist crepitating rattle with large bells, or something like the fluid or mucous gurgling heard in large but full vomicæ, or emitted by several small communicating vomicæ. Occurring as it did after pneumonia, with inaudible respiration all above and below its site, and so low down as the lower angle of the scapula, and a little below the axilla, I did not think it at all likely that it was produced by a tubercular cavity or vomica I felt, indeed, rather at a loss as to its precise cause; and I satisfied myself with observing the phenomena, noting them as accurately as the condition of the patient would admit, and observing such changes as they might assume in the progress of the disorder, so that, if opportunity was afforded, a comparison might be instituted between them and the state of parts in the dead body.

When death took place, and the body was inspected, it was then very clearly seen what was the cause of this crepitous rattling or fluid gurgling. The gangrenous cavity, or rather abscess, filled as it was with semifluid matter, was situate partly in the lower part of the upper lobe, partly in the upper part of the middle lobe, and corresponded by this position to the part of the chest externally, where the fluid gurgling was heard, viz. the space extending from about one inch below the axilla, to the lower angle of the scapula. The moist crepitating rattling, therefore, heard on the 3d and afterwards, indicated the process of gangrenous solution at this part of the lung.

The symptoms gave this disorder first the character of pleuro-pneumonia, yet after some time the occurrence of this moist crepitating rattling tended to obscure the nature of the disorder, and to render the first opinion doubtful. While I was perplexed as to the exact nature of the affection, several symptoms took place which tended to show that gangrene had probably been proceeding. The patient became unusually feeble, was tormented with unquenchable thirst, and acquired a most haggard and ghastly look; and on the 21st of August, when the expectoration became all at once bloody, I was so satisfied that gangrene had taken place, that I thought it necessary to observe and note carefully the smell of the breath. It was not as yet fetid; but next day, when the expectoration was still more bloody, both the breath and the sputa were fetid, and it was impossible to doubt any longer that gangrene had taken place.

I have subjoined, in Plate II., a view of this lung, and the peculiar appearance of the gangrenous cavity. The hepatized portions are easily recognized. For this view, as well as that in the case of Fisher, I am indebted to the pencil of my friend, Dr Robert Paterson of Leith.

Before closing this paper, I may mention, that, besides the forms of gangrene of the lungs now described, there is another, which, though not very common, is occasionally met with. I have seen two specimens of this kind of gangrene; and I think from these, I can describe the general characters of the lesion.

In the kinds of gangrene already described, one portion of the lung or two become affected continuously, and without interruption, with death or gangrene, while the rest of the lung retains its vitality, may be comparatively sound, or may present only pneumonic induration proceeding to gangrene. But in the form of the lesion to which I now advert, a different state of one lung or of both lungs is presented. The whole substance of the organ is occupied with a considerable number of cavities, very irregular in shape, and of very different sizes, but all with the interior extremely ragged, containing, most commonly, dark or inky-coloured matter, viscid or semifluid, and exhaling a most fetid odour. When this inky-coloured viscid matter is removed by gentle washing, each cavity is observed to be lined by a new, pretty firm false membrane. These cavities are very irregular, and ragged interiorly; and the sections made of a lung thus diseased present the appearance of many holes of different sizes and shapes, with which the lung is as it were riddled.

In size and extent, however, these cavities rarely exceed a small hazel-nut, and more frequently they are much smaller. In this circumstance of small size and great multiplicity, they differ from the ordinary tubercular vomicæ of consumption, in which generally one or two large caverns are found in the upper lobe, and a few smaller vomicæ a little below these. It is almost never the case that in this form of gangrene there is a large-sized cavern; and never the case that they are few in number. They are also, though most numerous in the upper lobe of the lungs, distributed with considerable uniformity over the whole organ. As to comparative size, though the largest cavities are usually found in the upper lobe, and smaller cavities in the middle and lower lobe, there is in this nothing regular or uniform. There may be, for example, one or two ragged cavities as large as a filbert in the upper lobe, and a great number of smaller cavities; and there may be cavities as large as a filbert in the middle and lower lobe.

The pulmonic tissue, surrounding and intervening between these rugged cavities, is always firm, inelastic, hard, and often cartilaginous; and, indeed, between the firmness of the lining membrane of these cavities, and the cartilaginous hardness of the surrounding filamentous tissue of the lung, the whole lung is so much indurated that it cuts much like cheese or cartilage. These intermediate portions are reddish in colour and granular in aspect, and effuse much bloody serum; but they are intersected by whitish or gray bands, very firm, which are evidently the interlobular filamentous tissue much indurated.

The whole lung exhales an insupportably fetid odour, which is evidently to be traced to the cavities and the matter contained within them.

This gangrenous affection of the lungs is, I have reason to believe, much more chronic than the ordinary gangrene. It is the effect, evidently, of an inflammatory disease, as will appear by what I am presently to state; but the inflammatory action is, I think, much more slow in progress, and more tedious than even in the ordinary gangrene.

Case V.—The first instance in which I saw it very distinctly took place in the person of a man under the care of my friend Dr Alison. This person had suffered, though previously without any indication of disease of the lungs, a severe attack of confluent small-pox,—a disease which never fails to be attended with, or followed by, more or less, and sometimes very severe bronchial and pneumonic disorder. From the attack of small-pox he recovered; but it was succeeded in no long time by symptoms of pneumo-bronchial disorder. He had cough, breathlessness, occasional pains in the chest, and at length some expectoration. These symptoms continued for many weeks, notwithstanding the employment of many remedies. He lost flesh rapidly, or rather he never recovered after the commencement of the pulmonary symptoms. For some time before his death, he was decidedly hectic, and the expectoration and breath emitted a very fetid odour. At length he died apparently phthisical.

Upon inspecting the body, the whole of both lungs was found very extensively solidified and indurated. Both lungs were occupied with numerous cavities distributed through them, the largest not larger than filberts, but most of them about or beneath the size of a garden pea. These cavities were exceedingly irregular in shape as well as in size, and very ragged internally; those that were not empty contained a quantity of foul inky-looking matter, which emitted a very fetid odour.

*Epicrisis.*—This disease might be regarded by some as a variety of tubercular disorganization and ulceration; and, in point of fact, it has been already described under the name of *Ulcerous Phthisis* by Bayle, who has given, out of several cases which had fallen under his observation, two with dissections, (Cases XXV. and XXVI.); and in both of which the breath and expectoration were fetid during life, and after death the same kind of ragged gangrenous ulcers were found in the lungs. But that this lesion is to be distinguished from that following tubercular consumption, must be inferred from this fact, that, though the lungs are much indurated and solidified, we very rarely find in them the tubercular masses which constitute the anatomical characters of that disease. These gangrenous ulcers, on the contrary, appear to be the effect of a process of sloughing which has attacked individual lobules of the lungs previously indurated but not tubercular. It is proper to mention, that Dr Alison informs me, that he has several times seen these ragged gangrenous cavities in the lungs of persons attacked by chronic pulmonary disease after small-pox.

In the following case we have another example of the same kind of lesion of the lungs, combined with affections of various other organs.

Case VI.—Margaret Donald, aged 24, servant, was admitted into the Royal Infirmary on the 10th July 1840, labouring under symptoms indicating the presence of dyspeptic disorder, uterine derangement, and a peculiar sense of burning and pain of the inside, as she expressed herself.

The catamenia had been suspended, she stated, for about three years, and since that time she had suffered from squeamishness, sour eructations, total *anorexia*, a sense of distension of the belly, and an excruciating feeling of internal heat, referred to the hypomphalic region on both sides. She had also pain in the lumbar region; and she stated that the legs and feet were occasionally swelled. The tongue was covered with a viscid whitish fur; and she complained of a bad taste in the mouth, with much thirst. The belly was not distended, nor painful on pressure, and the sound emitted by percussion was natural. The bowels were habitually confined. The skin was dry, hot to the touch, and rather harsh. The pulse was 96, rather small. She complained much of alternate heat and chilliness, but most of the former. She had occasional headach. An opaque viscid discharge issued from the vagina. She had occasional *ardor urinæ*, and sometimes a sense of down-bearing in the hypogastric region.

The head was shaved, and the bowels were freely opened by the compound jalap powder and the saline infusion of senna.

For several days she was rather easier; but upon the 14th of July she spent a very uneasy night, in consequence of internal heat. She perspired profusely; and she complained a good deal of headach, with pain and noise in the head, and beating at the cardiac region; the pulse was 92. As the bowels were bound, they were directed to be opened by the use of the compound colocynth pill, and the saline infusion of senna.

Next day she was rather easier; but pain in the frontal and lumbar regions continued. As several of these symptoms seemed to depend upon the disordered state of the menstrual function, pills consisting of sulphate of iron and aloes, with twelve drops of the tincture of the muriate of iron, three times daily, were prescribed, and a blister was ordered to be applied to the loins.

Under the use of these remedies she continued for about six weeks, not improving, but not becoming worse. The sense of internal heat and uneasiness referred to the umbilical and hypogastric regions continued, and she described the pain as commencing in the left iliac region, and ascending towards the epigastric. On the 31st of August, when the distension of the belly was somewhat abated, there was considerable swelling and pain of both labia. The pulse was still 98, strong and full; and the tongue was covered with a viscid moist fur on the centre, though red at the margins.

The pills of sulphate of iron, and the tincture of muriate of iron, were stopped, and the bowels were opened, first by colocynth pills and castor oil, then by pills of calomel, aloes, and colocynth, and the saline infusion of senna. As the skin continued very dry, hot, and harsh, she was directed to use the warm-bath.

On the 4th of September the tumour in the site of the labia had burst on the right side, and discharged a considerable quantity of purulent matter and blood, with disappearance of the swelling and abatement of the pain.

On the 8th of September, as the feeling of internal heat and pain continued, and as she was herself desirous of losing some blood, in order to take away the inflammation, as she expressed it, from her inside, twenty ounces of blood were drawn from the arm, without producing faintness. The blood was not at all buffed, and she still complained of pain, referred chiefly to the left iliac region. The skin continued dry and harsh, and the tongue was furred; but the pulse was reduced to 86. As the bowels continued habitually slow, she was directed to take twice daily a wine-glassful of a mixture consisting of equal parts of the compound infusion of gentian, and the compound infusion of senna, and a little sulphate of magnesia.

She had been improving till about the 20th or 21st of September, the internal pain and heat being diminished, the appetite increased, and strength returning. But about this time, 20th September, the pain referred to the hypogastric region was increased, and she complained still of the sense of internal heat, which was referred to the lips, mouth, and entire gastro-intestinal mucous surfaces. The skin was dry, harsh, and imperspirable; the pulse 80; the countenance and features rather contracted; and considerable emaciation had taken place. She complained also of occasional *ardor urinæ*, and painful micturition; but there was no discharge from the vagina, or the external parts of generation. The pulse was 80.

She was ordered the warm-bath and a scruple of Dover's powder at bed-time, which was repeated at intervals, according to the symptoms.

During the whole of October and November the painful sensation of heat in the left iliac and hypogastric region continued, with dryness and harshness of the skin; but nothing unusual could be detected by examining the belly. The pulse was 76 on the 12th of November. At this time she was ordered two grains of the magistery of bismuth twice daily.

A new train of symptoms now commenced. This young woman had always shown marks of imbecility of intellect. Her mind was throughout the whole course of her complaints tinged with a deep shade of melancholy, gloom, and despondency. She imagined that she had been guilty of many heinous sins; and frequently expressed her conviction that all her corporeal sufferings were intended as punishments for her transgressions. She became very sleepless, and, instead of retiring to bed at night, she used to wander up and down the ward, and through various parts of the house. Upon one or two occasions she went down to the gate, and got out of the house altogether, and came back at a very late hour. Upon other occasions she drank at once large quantities of the medicine prescribed for other patients. When interrogated as to the reason of her conduct, she maintained an obstinate silence; and indeed she was wont to sit for hours and sometimes days without speaking to a living soul, and uttered only groans and exclamations of distress and melancholy. She was now, indeed, in a state of complete *lypemania*, which partook in some measure of the religious character. She was much emaciated.

All medicine was given up; and she was allowed food and wine as she chose to take it. The head, however, was shaved; and I recommended that the chaplain should have some conversation with her.

In this manner, she went on for about five weeks longer, the emaciation and debility very much increasing, but her mental disorder subsiding into a state of calmness with great taciturnity. Between a fortnight and three weeks previous to death, her person exhaled a very fetid odour, which I was inclined to ascribe to the return of the vaginal discharge, to diarrhœa, under which she was now labouring, or to sloughing of the sacrum and hips. The nurse, however, maintained that there was no slough on the back. The emaciation proceeded steadily with the fœtid smell, yet without cough or manifest expectoration, and death took place on the 22d of January 1841.

Inspection of the body on the 26th of January disclosed the following appearances.

*The Head.*—The skull was extremely firm, heavy, compact, and sonorous; and the processes internally, as well as the depressions, were very strongly marked. The *dura mater* was not thickened, but it hung rather loosely on the membranes of the brain and the brain, so as to form in various parts pouch-like dilatations. A small quantity of fluid was effused into the subarachnoid tissue, sufficient to flow in minute streams by incisions from the convolutions, but not enough to elevate sensibly the arachnoid membrane from the *pia mater*. The *pia mater* did not adhere to the convoluted surface of the brain more strongly than usual, and it came off easily from every part of the brain and cerebellum.

The convolutions were a little flattened but not atrophied, that is, not separated from each other or diminished in size. About two drachms of serous fluid were found in each lateral ventricle, the largest quantity being in the posterior *cornu*, where it had accumulated from the dependent position of the cavity. A little serous fluid was also found in the base of the brain, and a quantity escaped from the cavity of the spinal cord.

*The Chest.*—The right lung adhered along its outer and anterior part to the *pleura costalis*, and adhesions also connected the lower surface of the lower lobe to the diaphragm; and upon the posterior part of the lung were loose membranous adhesions. The whole lung itself was considerably solidified by firm solid portions. The apex of the lung was puckered and contracted and slightly emphysematous; but below this was a large bluish-coloured solid mass of indurated lung. When this was divided by incisions it presented several cavities, none very large, but all containing a quantity of soft ashy-coloured blackish matter, and discharging a fetid smelling inky fluid. At the very apex of the lung was a small cavity, grayish-coloured, and containing puriform matter, which could be scooped out, and after the removal of which, the surface of the cavity seemed lined with a membrane. The rest of the lung was in general occupied with solid masses, irregular in shape and size, granular in the interior, but not tubercular. The colour of these masses was various, generally of a deep reddish-brown, sometimes of a bluish or violet-coloured red. In many parts, especially in the lower lobe, the lung was friable and lacerable. Parts of this kind, when cut out and thrown into water, fell to the bottom, and when examined carefully opposite the light showed a considerable quantity of grayish-coloured deposit, in small patches. A good deal, however, floated, especially where it was not penetrated by the grayish-coloured matter. The internal and anterior, or mesial margin of the lung, was a little emphysematous. The bronchial tubes were dilated, especially where they approached indurated parts, and their lining membrane was reddish-coloured and villous.

The left lung contained a few solid firm and dense portions, separate and disseminated; but the organ was in general elastic and crepitating.

From fourteen drachms to two ounces of serous fluid were contained within the cavity of the pericardium. The outer surface of the right auricle and ventricle was covered with a rough, firm, grayish-coloured deposit of albuminous matter.

*The Abdomen.*—The right kidney had a little gray-coloured granular matter deposited in its striated texture; but it was otherwise pretty healthy. The left kidney had formed pretty firm adhesions with all the surrounding parts, especially the left angle of the transverse arch of the colon, and it was also considerably larger, and more prominent than natural. When taken out, the tunic was found much thicker, stronger, and firmer than natural, and more closely adherent to the surface of the gland. From many parts, indeed, the tunic could not be taken off without tearing away from it portions of the surface of the kidney. When the tunic was removed, the surface of the kidney appeared highly vascular, mottled, and variegated with reddish-gray and whitish patches. Several of these whitish patches seemed, at first sight, like grains of fatty matter, or encephalomatous deposit; but most of them, when opened, contained a thick cream-like, semifluid matter, enclosed within a cyst. The posterior surface of the kidney contained not fewer than nine of these whitish-coloured encysted abscesses. The cortical matter of the kidney was also penetrated in various parts with gray-coloured granular matter. All the calyces were very much enlarged and distended; but no calculus was found in either of them, or in the pelvis.

The uterus and vagina were carefully examined, but neither their mucous membrane nor their substance presented anything unusual. In the intestinal canal the mucous membrane was a little villous, and the glands of Peyer were elevated, rough, and more distinct than natural; and in one or two points towards the lower end of the ileum, they were abraded and slightly ulcerated.

*Epicrisis.*—This case suggests many observations, which it would take up too much space to introduce in this place. One or two merely I shall here mention. It appears, in the first place, that the sense of internal heat and pain of which this woman complained, must have depended upon the state of the left kidney. It seems to be not at all doubtful that the small whitish-coloured bodies disseminated through the cortical texture of the left kidney were abscesses, the result of chronic inflammation; and it seems impossible to doubt that this chronic inflammation had commenced, and was going on steadily at the time at which the patient was admitted into the hospital. Inflammation at the same time seems to have been going on in the investing tunic of the kidney, for it was only by means of inflammation that it could have contracted the preternaturally firm adhesion on the one hand, with the surface of the gland, and on the other, with the contiguous organs. This inflammatory action in the tunic might either have been independent of, or excited by the chronic inflammation in the kidney. The latter, perhaps, is the most probable view. I think also that there is no doubt that this chronic inflammatory disease of the kidney had been the cause of the sense of constant pain and burning heat referred to the left iliac region, and to the inside generally.

With regard to the mental disorder, the symptoms of which appeared very soon after admission, it must be observed that this woman was always imbecile or of an intellect of limited intensity. It is difficult to say whether the mental disorder depended upon the state of the skull, the *dura mater*, and the brain, or whether the morbid state of these parts was the effect of the dark and gloomy kind of melancholy under which this woman was labouring. It seems most natural to infer that the extreme density and compactness of the skull, and the atrophied state of the brain, must have exerted a considerable effect upon the mental faculties, and the manner in which they were exerted; and, while we are not entitled to say, that these changes were not adequate to produce mental disorder, it is not easy to see why they should have produced the particular form of mental derangement which this woman presented. It was not mania, properly speaking; neither was it fatuity or idiocy; but rather a particular form of lypemania; and this has been known to have been connected with various chronic diseases of the abdominal organs.

Lastly, with regard to the affection of the right lung, it is to be remarked, that it must have come on in a very insidious way. Soon after her admission, the chest was repeatedly examined by auscultation, and nothing morbid was recognized on either side. After emaciation began to be manifest, I repeatedly interrogated her whether she had cough or pain in the chest, or brought up phlegm, or blood, or anything else by expectoration, and the uniform answer was, that she had neither; and to this statement the nurse always added her corroborative testimony. Even about the end of November or beginning of December 1840, when wasting was so considerable that the temples and eyes were hollow, and she seemed little better than a skeleton, and I thought and repeatedly expressed the opinion, that all this wasting must be connected with disease either in some of the abdominal organs, or disease of the lungs, and that she was probably phthisical, she still maintained that she had no cough, no pain in chest, and no expectoration.

As it seemed to be absurd, if not positively injurious, to exhibit medicine in a case of this kind, and at this stage, the treatment was entirely dietetic; and her feebleness was so great that it was impossible to examine her with the necessary care.

To speak, then, of fixing the commencement of this pulmonary affection is impracticable. It seems most reasonable, however, to think that it began about the end of November or beginning of December, and if this conjecture be well founded, the duration of the disorder must have been between seven and eight weeks. The anatomical appearances of the lung after death showed distinctly that it was an example of the ulcerous phthisis of Bayle, or that kind of gangrenous ulceration of the lungs which I have above attempted to describe.

With regard to what may be called the mechanism of this kind of ulcerous gangrene, I think it also results from the anatomical appearances that the disorder is in its origin a species of chronic pneumonia of the lobular kind, that is to say, inflammation attacking the lung in its individual lobules. The hard granular indurated masses observed in the right lung of this woman with healthy elastic lung interposed, must have been the result of inflammation developed in each lobule simultaneously or successively. As inflammation proceeded, it naturally gave rise to morbid products, and as these products must have been effused within spaces comparatively circumscribed, the rapidity and the certainty with which they produced induration, consolidation, and all the other effects in the lobules must have been great; and as, from the limits within which the inflammation was confined, these products could not spread beyond the parts originally inflamed, the latter would the more readily give way and be deprived of all circulation and vital action, and hence the parts thus inflamed would be dissolved in a species of gangrenous ulceration.

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## ART. II.—*The Static Lung Tests.* By WILLIAM AUGUSTUS GUY, M. B. Cantab. Professor of Forensic Medicine, King's College, London, and one of the Physicians to the King's College Hospital.

UNDER the title of Static Lung Tests, I propose to examine the absolute weight of the lungs, and their weight as compared with that of the body. Both these tests were proposed by Ploucquet, but the latter is most in use, and most commonly bears the name of its author. It was originally brought forward on the authority of three observations, two on still-born children at full term, the third on a seven months' child which had respired. Though Ploucquet spoke much too confidently of the advantage to be derived from the employment of this test, he was far from supposing his three facts sufficient to establish a true standard of comparison, but urged upon those of his contemporaries who enjoyed favourable opportunities for making such observations, the necessity of confirming or invalidating his conclusions by a more extended induction. Accordingly, it was not long before this appeal was responded to by the publication both of single facts and of small groups of observations; which, whilst they confirmed the general position that the weight of the lungs compared with that of the body differs before and after respiration, proved that that difference had been greatly over-estimated by the original proposer of the test.

The small groups of facts published by Jäger, Mörike, and Haartmann, towards the end of the 18th century, were followed early in the 19th by the larger collection of Schmitt, and this again by Lecieux's tables containing not fewer than 400 observations.

The very considerable number of facts thus brought together by Lecieux, would appear to promise a solution of all the questions which are likely to arise in connection with the static lung tests; but on submitting his tables to a careful scrutiny, a large proportion of his facts are found utterly useless for all purposes of strict comparison. Devergie, after eliminating all those observations which appeared to him objectionable, has succeeded in preserving about 200 facts, from which he has constructed the tables contained in his work. If all these facts were employed in establishing a single proposition, they might justly be regarded as sufficient for the purpose; but when it is recollected that they are used to determine the proportion between the weight of the lungs

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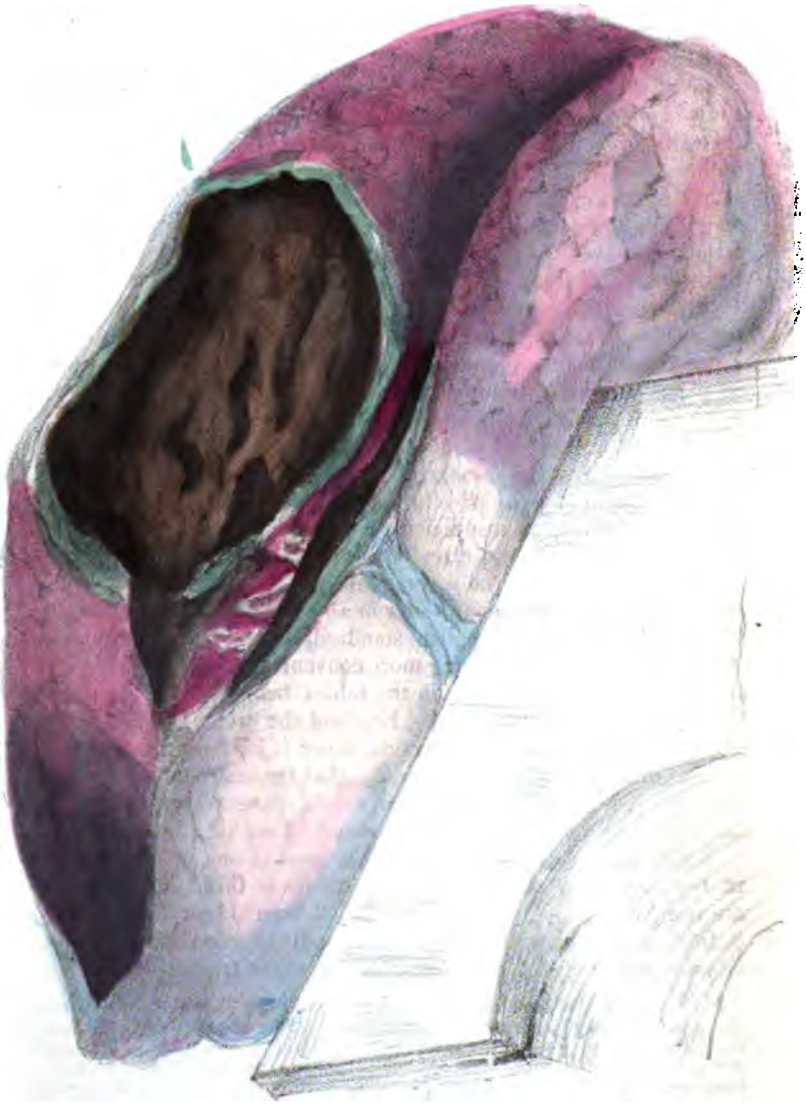

Circumscribed Gangrene of the Lungs.

and that of the body before and after respiration, at 6, 7, 8, and 9 months, it will be obvious that a larger assortment of facts is still to be desired. To supply this desideratum is the object of the present essay.

As no single individual can hope to make a collection of facts so large as to supply all the data necessary to determine the real value of the static lung tests, I have thought that I might render some service to the science of forensic medicine by bringing together all the facts which I could collect from domestic and foreign authorities. This has been a greater labour than I at first contemplated; for, in addition to the task of reducing the foreign weights to our own standard, the subsequent arrangement of the facts themselves, preparatory to drawing conclusions from them, has occupied at least as much time as the subject is worth.

Although this investigation was at first undertaken merely for my own satisfaction, I have bestowed as much pains upon it as if I had from the first intended making the results which I obtained public. The facts which I have grouped together have been as nearly as possible comparable facts; I have examined them one by one, and excluded such as were in any respect objectionable; and I have stated the average and extreme results in such a way as to enable others to add to the facts which I have collected wherever they appear insufficient. I have also taken the precaution of putting by themselves such maxima and minima as seem to form exceptions to the several rules, or to be much greater or less than the numbers next below or above them. In reducing the foreign weights to the English standard, I have made use of the Avoirdupois weight, as being more convenient. This will account for the weight of the lungs in the tables being greater than it is usually represented to be. In England the weight of the lungs is usually expressed in Troy grains, hence it has been necessary to convert them into Avoirdupois grains, that the same standard might be employed in all the observations. I have taken care in all cases to satisfy myself of the correctness of my calculations.

The total number of facts which are used in one way or another in the formation of the following tables is 652. Of these, 3 are from Ploucquet, 4 from Mörike, 2 from Jäger Senior, and 8 from Jäger Junior.[*] Haartmann's dissertation has supplied me with 19 observations,[†] Schmitt's excellent treatise with 100,[‡] and that of Lécieux, with 348.[*] I have made use of 48 observations contained in an anonymous essay, published at Paris in connection with several treatises on midwifery.[†] Orfila has contributed 17 observations of his own, and 47 which he published on the authority of Eisenstein and Zébisch, and which were made under the eye of Bernt.[‡] From Devergie's work I have obtained 17 facts,[§] and from that of Jörg 6 facts.[||] From domestic sources I have not been able to glean any large number of facts. To Mr Taylor's excellent essays,[¶] and to his courtesy I am indebted for 8 facts. Five others I have gleaned from a paper by Dr Brady,[**] and I have added 20 observations of my own.[††] I might have added to the number of my facts had the subject appeared of sufficient importance to require a more extended induction. Many single facts are doubtless scattered through the foreign journals, and many small collections of facts might be discovered if the search for them promised to repay the labour which it entails. As it is, the facts now brought together are much more numerous than any single collection which has been hitherto formed, and they are numerous enough to establish the principal data necessary for medico-legal inquiries. By stating the sources from which I have drawn my facts, as well as the number of facts from which each average is obtained, I have given every facility for adding to the collection which I have thus made, any new facts observed by myself or others; and as some of the averages are formed from insufficient materials, it will be easy to correct them at any future time, by increasing the number of observations.

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[*] The facts supplied by Ploucquet, Mörike, and the two Jägers, father and son, are embodied in the essay entitled "Uber die ausführbar keit des von Herrn Professor Ploucquet gemachten Vorschlags zu einer neuen Lungenprobe; von Herrn Hofmedicus, Dr Jäger in Stuttgardt, 1796." This essay is published in the Salzburg Med. Chir. Zeit. B. iii. p. 56.

[†] Haartmann's treatise is translated by Rudolphi in the Nordischen Archiv. B. ii. St. ii. No. 3.

[‡] "Neue Versuche und Erfahrungen über die Plouoquet's che und hydrostatische lungenprobe. Von Dr Willelm Joseph Schmitt," Vien. 1806. This treatise contains a large collection of well-observed facts and experiments, and abounds in sound and judicious conclusions from them.

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[*] Considerations Medico-légales sur l'Infanticide, par A. Lécieux, à Paris, 1819. The number of facts published by Léceiux, is 400. Of these, I have been able to make use of 348 only, the remainder being so badly reported as to be utterly useless. Devergie has not made more than 200 available for his purposes; but he has limited his inquiries to children who have lived one month or less, whilst I have admitted a considerable number of observations on children above that age. This difference sufficiently accounts for the larger number of facts which I have been able to make use of. I have admitted as still-born, 30 observations on lungs, which, not being putrid or diseased, sank when placed in water, though it is not positively stated that respiration had not taken place. The only source of fallacy here is that extremely imperfect degree of respiration which is compatible with sinking of the lungs; but, as cases of this kind are of very rare occurrence, these observations may be safely embodied with those made on still-born children. I have been obliged to correct a large proportion of Lécieux's calculations.

[†] Proces-Verbal de la distribution des Prix, &c. 1812. Some of the observations contained in this paper seem to have been reprinted in Lécieux's treatise. In making use of these duplicates, I have not introduced any important fallacy.

[‡] Traité de Medecine Legale, Vol. i. p. 404. The observations of Eisenstein and Zébisch are the only ones which I have not been able to procure and examine for myself. The title of the work from which they are taken is not given, and I have not been able to procure that in which they were most likely to be found. I have therefore trusted in this instance to Orfila's high authority.

[§] Medecinè Legale. Vol. i. Article Infanticide.

[||] Atelectasis pulmonum. By Dr Edward Joerg of Leipsig.

[¶] Guy's Hospital Reports. No. 5. See also London Medical and Physical Journal for 1832 and 1833. One fact has been kindly forwarded to me by Mr Taylor since the publication of his essay in the Guy's Hospital Reports.

[**] Dublin Journal of Medical Science.

[††] For the opportunity of making these observations, I am chiefly indebted to the kindness of my friend and neighbour, Dr Reid.

The facts which have been thus brought together supply data for discussing the value of the absolute weight of the lungs, and of their weight compared with that of the body, as tests of respiration. I propose to examine each of these separately, beginning with the *absolute weight of the lungs.*

The following table shows the weight of the lungs in mature still-born children, of either sex, and of both sexes combined, the number of observations being 51 male, 44 female, and 109 of both sexes.

TABLE I.

| | Before Respiration. | | |
|---|---|---|---|
| | Male. | Female. | Male and Female. |
| Maximum, | 1800 | 1492 | 1800 |
| Minimum, | 360 | 340 | 340 |
| Mean, | 986 | 818 | 896 |

In the case of the male, the numbers next below 1800 are 1726, 1661, and 1636, and those next above 360 are 494 and 498. In the female, the numbers next below 1492 are 1226 and 1193, and those next above 340 are 369 and 463. Of the fourteen observations in which the sex is not stated, the highest number is 1534, and the lowest 448.

The following table gives the weight of the lungs, in the two sexes separately, and in both combined, in the 6th, 7th, and 8th months of fœtal life.

It is necessary to premise, that, in all the observations which are made use of in constructing the tables, the lungs are either stated or inferred to be healthy. Where they are not stated to be diseased, they may fairly be assumed to be healthy, as all the authors who have written on the subject have taken pains to describe the condition of the lungs, and, in many instances, the fact of their being diseased is distinctly stated. As, moreover, diseases of the fœtal lungs are of very rare occurrence, no material fallacy is likely to be introduced by this assumption.

The numbers of observations from which the table is formed are as follow ; 6th month—male 8, female 8, male and female 16 ; 7th month—male 11, female 14, male and female 27 ; 8th month—male 20, female 12, male and female 37 ; total number 80.

TABLE II.

| | 6th month. | | | 7th month. | | | 8th month. | | |
|---|---|---|---|---|---|---|---|---|---|
| | M. | F. | M. & F. | M. | F. | M. & F. | M. | F. | M. & F. |
| Max. | 710 | 747 | 747 | 1081 | 1364 | 1364 | 1318 | 1462 | 1462 |
| Min. | 228 | 149 | 149 | 293 | 232 | 232 | 216 | 309 | 216 |
| Mean. | 393 | 349 | 371 | 626 | 633 | 612 | 714 | 697 | 701 |

This table is one of those which will require correction when a larger number of facts has been brought together. It presents many anomalies, only to be explained on the supposition that the facts are not sufficiently numerous. Thus, the maxima in the female exceed those in the male at each of the periods, whilst the maximum in the female at nine months falls short of the maximum in the male by more than 300 grains. The minima, too, present similar anomalies. This arises partly from the circumstance that, in the several groups of facts, the age has a range of one month, and partly from the difficulty which exists in fixing with certainty the age of the fœtus at the several periods of utero-gestation. In the instance of the female in the 6th month, the minimum 149 is the weight of the lungs of a twin fœtus, 5¼ months old; the number next above this is 262. In the female in the 7th month, the number next greater than 232 is 324, and in the male in the 8th month, the number next above 216 is 401. In the case of the maxima, the highest numbers are much greater than those next below them. Thus, in the 6th month, 455 is the number next below 710 in the male, and 340 that next less than 747 in the female. In the 7th month, 1081 is the maximum for the male, and 864 the second number on the list; but in the female, the three greatest numbers are 1364, 1019, and 819. In the 8th month the maxima for the male and female respectively are 1318 and 1462, the next greatest numbers 1081 and 1235.

The observations made on the males and females, taken together, present a greater degree of uniformity. Their results, combined with those already obtained for the 9th month, are seen in the following table.

TABLE III.

| | 6th month. | 7th month. | 8th month. | 9th month. |
|---|---|---|---|---|
| Maximum, | 747 | 1364 | 1462 | 1800 |
| Minimum, | 149 | 232 | 216 | 340 |
| Mean, | 371 | 612 | 701 | 896 |

I now proceed to state the corresponding results of observation made on children who have respired.

The following table presents the weight of the lungs after respiration in mature children who lived one month or less; the lungs being, as before, stated or inferred to be healthy. The number of observations is as follows: male 171; female 130; male and female 322.

TABLE IV.

| | After Respiration. | | |
|---|---|---|---|
| | Male. | Female. | Male and Female. |
| Maximum, | 2440 | 1745 | 2440 |
| Minimum, | 432 | 479 | 432 |
| Mean, | 1121 | 986 | 1077 |

The six greatest weights in the male are, 2440, 2132, 2085, 2046, 1853, 1825; in the female they are, 1745, 1725, 1576 (two), 1561, 1544, (three), 1514, (three). There are also two observations on record which so greatly exceed the maxima in either sex that I have thought it right to omit them altogether. One is recorded by Mörike, the other by Haartmann. The former is 3426, the latter 3410. Jäger Junior considers the first a misprint, the second occurred in a case of suffocation. The minima require no particular remark, except that there is one observation on record, which makes the weight of the lungs in the male as small as 293, the number next above it being 432. This latter number is entered in the table as the minimum.

The following table shows the weight of the lungs after respiration in the 6th, 7th, and 8th months. The number of observations is as follows. 6th month—male 5, female 10, male and female 15. 7th month—male 19, female 16, male and female 39. 8th month—male 21, female 24, male and female 49. Total 103.

TABLE V.

| | 6th month. | | | 7th month. | | | 8th month. | | |
|---|---|---|---|---|---|---|---|---|---|
| | M. | F. | M. & F. | M. | F. | M. & F. | M. | F. | M. & F. |
| Max. | 499 | 685 | 685 | 1278 | 1286 | 1286 | 1407 | 1534 | 1534 |
| Min. | 247 | 232 | 232 | 309 | 386 | 309 | 262 | 384 | 262 |
| Mean. | 328 | 441 | 404 | 595 | 694 | 641 | 780 | 734 | 762 |

This table presents the same anomalies as the corresponding table before respiration; these must be attributed partly to the small number of facts, and partly to some cause not easily discovered. The weight of the female lungs exceeds that of the male in more than one period both in the maxima, minima, and mean, and the same circumstance is observable in the table showing the weight of the lungs before respiration. In addition to the five observations on the male lungs at the sixth month, there is one not included in the table in which the weight of the lungs did not exceed 93 grains, and in the case of the female lungs, there is one instance of a twin fœtus at 5¼ months, where the weight was only 38 grains Troy. I shall take a future opportunity of detailing the particulars of this curious case, which came under my own observation.

The following table shows the weight of the lungs in the two sexes taken together at the 6th, 7th, 8th, and 9th months.

TABLE VI.

| | 6 months. | 7 months. | 8 months. | 9 months. |
|---|---|---|---|---|
| Maximum, | 685 | 1286 | 1534 | 2440 |
| Minimum, | 232 | 309 | 262 | 432 |
| Mean, | 404 | 641 | 762 | 1077 |

The data furnished by the first of the three foregoing tables are scarcely exact enough for medico-legal purposes. In the majority of cases of infanticide, the crime is committed soon after the birth of the child, and is rarely delayed beyond the first twenty-four hours. Hence it is very important to ascertain the absolute weight of the lungs for different durations of respiration, and especially for the shorter periods. I have accordingly prepared the following tables for children at full term.

### TABLE VII.

| | Less than 1 hour. | | | 12 hours. | | | 1 day. | | |
|---|---|---|---|---|---|---|---|---|---|
| | M. | F. | M. & F. | M. | F. | M. & F. | M. | F. | M.&F. |
| Max. | 1621 | 1499 | 1621 | 1537 | 1010 | 1537 | 1576 | 1725 | 1725 |
| Min. | 510 | 384 | 384 | 463 | 556 | 463 | 479 | 548 | 479 |
| Mean, | 934 | 780 | 934 | 955 | 726 | 859 | 1001 | 1045 | 1018 |
| No. of obs. | 21 | 11 | 38 | 13 | 9 | 24 | 8 | 8 | 17 |

As I have already stated, there is one observation on record which makes the weight of the lung in the male at 9 months so low as 293 grains. This observation belongs to the first column.

The following tables show the average weight of the lungs after different durations of respiration.

### TABLE VIII.

| | Less than 1 hour. | 12 hrs. | 1 day. | 2 days. | 3 days. | 4 days. | 5 days. | 6 days. | 7 days. |
|---|---|---|---|---|---|---|---|---|---|
| Male, | 934 | 965 | 1001 | 1073 | 942 | 1412 | 1097 | 1143 | 955 |
| Female, | 780 | 726 | 1045 | 725 | 980 | 927 | 882 | 1037 | 1061 |
| M. & F. | 934 | 859 | 1018 | 989 | 1001 | 1136 | 1020 | 1105 | 1008 |
| No. of Obs. | 21.11 | 13.9 | 8.8 | 14.6 | 9.9 | 9.16 | 10.11 | 10.7 | 7.7 |
| | 38 | 24 | 17 | 23 | 21 | 28 | 22 | 18 | 14 |

### TABLE IX.

| | 1 day & less. | 1st week | 2d week. | 3d week. | 4th week. | More than 1 month and less than a year. | more than 1 year. |
|---|---|---|---|---|---|---|---|
| Male, | 958 | 1037 | 1231 | 1258 | 1385 | 1285 | 1699 |
| Female, | 838 | 901 | 1067 | 1033 | 1441 | 1496 | 1745 |
| M. & F. | 937 | 914 | 1170 | 1196 | 1417 | 1446 | 2051 |
| No. of obs. | 42.28 | 101.84 | 51.37 | 9.5 | 3.4 | 4.13 | 4.1 |
| | 79 | 205 | 92 | 6 | 7 | 17 | 5 |

These tables confirm the general observation that respiration is a gradual process, causing the lungs to be more completely filled with blood the longer it lasts. The irregularities observed in the tables are sufficiently explained by the small number of observations from which some of the averages are deduced. If the increased weight of the lungs be a valid reason for inferring a more perfect respiration, we may expect to find the weight of the lungs greater in those cases where respiration is stated to be perfect, than where it is stated to be imperfect, and in these latter cases greater than when respiration has not taken place. The following table confirms this expectation.

### TABLE X.

| | MALE. | | | FEMALE. | | | MALE & FEMALE. | | |
|---|---|---|---|---|---|---|---|---|---|
| | Still-Born. | Resp. impt. | Resp. perft. | Still-Born. | Resp. impt. | Resp. perft. | Still-Born. | Resp. impt. | Resp. perft. |
| Maximum, | 1800 | 2132 | 2406 | 1492 | 1514 | 1725 | 1300 | 2132 | 2046 |
| Minimum, | 360 | 510 | 746 | 340 | 622 | 616 | 340 | 510 | 616 |
| Mean, | 986 | 1010 | 1227 | 818 | 947 | 1139 | 896 | 988 | 1195 |
| No. of obs. | 51 | 23 | 21 | 44 | 6 | 12 | 109 | 30 | 33 |

Having thus examined the weight of the lungs before and after respiration, at the several periods of gestation; after different durations of the respiratory process; and in its different degrees of perfection; I now proceed to contrast the results obtained before and after respiration, making use for that purpose of the foregoing tables. The first table, which combines Table I. and Table VII., shows the weight of the lungs before and after respiration, in mature children, the duration of the respiration not exceeding one day. No distinction of sex.

### TABLE XI.

| | Before Respiration. | After Respiration. | | |
|---|---|---|---|---|
| | | Less than 1 hour. | 12 hours. | 1 day. |
| Maximum, | 1800 | 1621 | 1537 | 1725 |
| Minimum, | 340 | 384 | 463 | 479 |
| Mean, | 896 | 934 | 859 | 1018 |

From this table it appears that the maximum weight of lungs observed in still-born children exceeds the maximum weight in those who have lived one day or less; that the least weight after respiration exceeds the minimum before respiration by only 44 grains, and that the mean weight is increased by respiration lasting less than an hour only 38 grains, whilst at the end of 12 hours it falls short of the weight in still-born infants by 37 grains. Even when respiration has continued as long as one day, the average weight of the lungs is increased by only 122 grains. The following table, combining Table III. with Table VI., presents a view of the effect of respiration in increasing the weight of the lungs at 6, 7, 8, and 9 months.

## TABLE XII.

| | 6 months. | | 7 months. | | 8 months. | | 9 months. | |
|---|---|---|---|---|---|---|---|---|
| | Before resp. | After resp. | Before resp. | After resp. | Before resp. | After resp. | Before resp. | After resp. (1st day.) |
| Max. | 747 | 685 | 1364 | 1286 | 1462 | 1534 | 1800 | 1725 |
| Min. | 149 | 232 | 232 | 309 | 216 | 262 | 340 | 479 |
| Mean, | 371 | 404 | 612 | 641 | 701 | 762 | 896 | 1018 |

This table corresponds closely with the former, in exhibiting a very inconsiderable increase effected in the weight of the lungs by the act of respiration; and both of them yield results very different from the general statements of authors, based on the authority of a small number of facts.

There is only one point connected with the weight of the lungs which requires investigation in addition to those illustrated by the foregoing tables, and that is the comparative weight of the two lungs. Seventeen observations of my own give the following results. (No distinction of sex, fœtal age, or duration of respiration.)

## TABLE XIII.

| Before respiration (11 observations.) | | After respiration (6 observations.) | |
|---|---|---|---|
| Right lung. | Left lung. | Right lung. | Left lung. |
| 313 | 243 | 465 | 353 |

| Before and after respiration (17 observations.) | |
|---|---|
| Right lung. | Left lung. |
| 367 | 282 |

These three averages agree in giving about the same proportion between the weight of the right and left lung, viz. 9 to 7. As this proportion is of no material importance, I have contented myself with my own limited number of observations.

An inspection of the tables and a close examination of the facts out of which they have been formed, lead us at once to the conclusion, that the absolute weight of the lungs, as a test of respiration, has been greatly overrated; for, on comparing the absolute weight of the lungs at full term before respiration, with the absolute weight of the lungs at full term, after respiration has continued one day or less, I find that the maximum before respiration exceeds the highest number after respiration by 75 grains, the numbers being 1800 and 1725, whilst the minimum after respiration exceeds the minimum before respiration by only 139 grains. The average number before respiration also exceeds the average number after respiration has continued twelve hours by 37 grains, though it falls short of the average number when respiration has continued one hour or less by 38 grains, and when it has continued one day by 122 grains. After making all due allowance for the insufficiency of the facts collected, and admitting that the numbers now stated would be somewhat modified by using a greater number of observations, it will be impossible to deny that the value of this test has been greatly exaggerated. If the maximum after respiration, instead of falling short of the maximum before respiration, had considerably exceeded it, we should have been justified in considering all numbers intervening between the two extremes as affording a high probability that respiration had taken place. On the other hand, if the minimum before respiration had fallen considerably short of the minimum after respiration, we should have had an equally strong probability that all numbers intervening between the two minima belonged to lungs which had not respired. Again, had the average results after respiration uniformly and greatly exceeded the average before respiration, we might have regarded any number nearly approaching the one or the other average as affording a certain degree of probability that respiration had or had not taken place. The results, however, which have been obtained, entirely destroy the confidence which has been hitherto placed in this static lung test, and prove that neither the maxima, minima, nor mean numbers afford any indication which can be relied upon for medico-legal purposes. A comparison of the average and extreme weights of the lungs before and after respiration, confirms the view now taken of the utter uselessness of employing the absolute weight of the lungs as a test of respiration.

The results which have been arrived at, not only destroy our confidence in the value of this lung test, but tend materially to modify the prevailing views of the nature and effect of respiration. Physiologists and writers on forensic medicine have assumed that the lungs, before the establishment of respiration, are almost free from blood, and that, as soon as breathing takes place, blood flows to them in large quantities, so as to cause a considerable increase in their weight. In pursuance of this erroneous opinion, the weight of the lungs before respiration has been greatly under-estimated, and their weight after respiration proportionably exaggerated. Some of the earliest observations which I had an opportunity of making led me to doubt the correctness of the prevailing opinion; for in more than one instance I found the lungs of still-born infants congested with blood, whilst those of children that had breathed contained but a small quantity of that fluid. Of this fact two explanations may perhaps be given;—the one, that the fœtal lungs naturally contain nearly as much blood before as after respiration, the other, that, even where no air enters the lungs, ineffectual efforts to respire are made, which give place for the admission of an unusual quantity of blood into the lungs. Such efforts are probably made by many infants who perish before any air has found its way into the chest.

Though the difference between the weight of the lungs before respiration and after respiration has continued for a short space of time is certainly very considerable, this may, and most probably does, arise from the circumstance, that respiration is gradually established, and remains imperfect for many hours, or even for some days in the great majority of infants who die within that period of their birth. That this explanation is the true one will appear on an examination of Tables VIII. and IX., which represent the weight of the lungs as augmenting with the duration and consequent increasing completeness of the respiration ; and still more strikingly, on inspecting Table X., which exhibits the effect of different degrees of respiration on the weight of the lungs. But even here, the increase of weight is not so considerable as we should expect to find it, if the process of respiration really exercised so important an influence as it is generally assumed to do on the weight of the lungs.

Having thus examined the value of the absolute weight of the lungs as a test of respiration, I now propose to consider the proportion which the weight of the lungs bears to that of the body, or ***Ploucquet's test.***

In discussing the value of this test, we have an advantage which Ploucquet did not possess, of reasoning from a considerable number of facts. A larger induction than that hitherto used has already demonstrated the insufficiency of the absolute weight of the lungs as a test of respiration ; by employing the same materials, we shall be able to ascertain the real value of Ploucquet's test. This test was first proposed on very plausible grounds. It was argued that, as the weight of the several organs of the body must vary with the weight of the body itself, it was necessary to take the weight of the body into account in all reasonings founded upon the weight of any of its organs. Nothing could be more natural than to expect, that, if in one case lungs weighing 500 grains belonged to a body weighing 30,000 grains,—a body weighing 60,000 grains would be furnished with lungs of 1000 grains; and nothing would at first sight appear more unreasonable, than to draw any conclusion from the weight of the lungs, without, at the same time, taking into account the development of the body to which they belonged. Had Ploucquet possessed a greater number of facts, he would in all probability have endeavoured to ascertain whether the weight of the lungs really does bear a fixed relation to that of the body, before he proposed his test with so much confidence. Hitherto this question, on the solution of which the value of Ploucquet's test really hinges, has been briefly decided in the affirmative, and the assumption has been carelessly received as a fact. The first step, therefore, to be taken in examining the value of this test is to determine whether or not the weight of the lungs does increase with the weight of the body, and if so, whether the increase in the one is exactly proportioned to that in the other.

That I might decide this question, I have arranged all the observations which I have collected on children at full term, in the order of the weight of the body, beginning with the greatest weight; and that the facts might be sufficiently numerous, I have made no distinction of sex. The following table, showing the rate of increase of the lungs and body respectively, in still born infants, will go far to decide the point in question.

### Table XIV.

| Number of Observations. | Weight of Body. | Average weight of Body. | Weight of Lungs. | Proportion. |
|---|---|---|---|---|
| 1 | 20000—30000 | 27030 | 541 | 1 : 50 |
| 22 | 30000—40000 | 35139 | 700 | 1 : 50 |
| 26 | 40000—50000 | 45004 | 754 | 1 : 60 |
| 21 | 50000—60000 | 55595 | 1005 | 1 : 55 |
| 19 | 60000—70000 | 64453 | 1068 | 1 : 60 |
| 4 | 70000—80000 | 77382 | 1317 | 1 : 58 |
| 1 | 80000—90000 | 87336 | 1226 | 1 : 71 |
| 2 | 90000 & upwards | 96330 | 1491 | 1 : 64 |

The following table, formed from a larger number of observations on infants after respiration, confirms the conclusions to be drawn from the foregoing table.

### Table XV.

| Number of Observations. | Weight of Body. | Average weight of Body. | Weight of Lungs. | Proportion. |
|---|---|---|---|---|
| 2 | 10000—20000 | 18535 | 533 | 1 : 34 |
| 59 | 20000—30000 | 27079 | 863 | 1 : 31 |
| 141 | 30000—40000 | 34614 | 1061 | 1 : 32 |
| 69 | 40000—50000 | 43448 | 1136 | 1 : 38 |
| 32 | 50000—60000 | 54020 | 1318 | 1 : 41 |
| 15 | 60000—70000 | 64581 | 1603 | 1 : 4 |
| 9 | 70000—80000 | 76127 | 1378 | 1 : 55 |
| 2 | 80000—90000 | 88041 | 2193 | 1 : 40 |
| 3[*] | 90000 & upwards | 113783 | 3273 | 1 : 34 |

From these tables it appears, that, though the weight of the lungs increases with the weight of the body, that increase is by no means regular, but that the proportion of the lungs to the body decreases as the weight of the body increases. The irregularity which is seen in both these tables would probably disappear on the addition of a larger number of facts. It appears, then, that we are not justified in assuming that the weight of the lungs, either before or after respiration, bears any fixed relation to that of the body.

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[*] These high numbers belong to children who had survived their birth a very considerable time.

But this question as to the proportion existing between the weight of the lungs and that of the body admits of a much more simple and satisfactory solution; viz. by comparing two observations in which the weight of the body is the same, and noting the difference in the weight of the lungs; or, *vice versa*, by taking the same weight of lungs, and noting the difference in the weight of the body. This comparison is made in the following tables, which are formed from observations on still-born infants at full term.

### TABLE XVI.

| Male. | | | Female. | | | Male & Female compared. | | |
|---|---|---|---|---|---|---|---|---|
| Body. | Lungs. | Propor. | Body. | Lungs. | Propor. | Body. | Lungs. | Propor. |
| 56631 | 1364 | 1 : 41 | 59018 | 1093 | 1 : 57 | 62769 | 852 | 1 : 74 |
| | 1280 | 1 : 44 | | 937 | 1 : 63 | | 1191 | 1 : 53 |
| 49806 | 892 | 1 : 55 | 57313 | 1193 | 1 : 48 | 55605 | 1023 | 1 : 54 |
| | 852 | 1 : 58 | | 814 | 1 : 70 | | 772 | 1 : 72 |
| 47882 | 880 | 1 : 54 | 44020 | 633 | 1 : 70 | 45364 | 1193 | 1 : 38 |
| | 710 | 1 : 68 | | 571 | 1 : 77 | | 649 | 1 : 70 |
| 40931 | 896 | 1 : 46 | 33981 | 682 | 1 : 44 | 30243 | 1112 | 1 : 27 |
| | 726 | 1 : 56 | | 575 | 1 : 59 | | 633 | 1 : 48 |

### TABLE XVII.

| Male. | | | Female. | | | Male & Female compared. | | |
|---|---|---|---|---|---|---|---|---|
| Lungs. | Body. | Propor. | Lungs. | Body. | Propor. | Lungs. | Body. | Propor. |
| 1193 | 66525 | 1 : 55 | 859 | 68230 | 1 : 80 | 896 | 49806 | 1 : 55 |
| | 45373 | 1 : 38 | | 51852 | 1 : 60 | | 38614 | 1 : 43 |
| 1148 | 57825 | 1 : 50 | 772 | 55605 | 1 : 72 | 860 | 62769 | 1 : 73 |
| | 42476 | 1 : 37 | | 33981 | 1 : 42 | | 51852 | 1 : 60 |
| 860 | 62769 | 1 : 74 | 688 | 53898 | 1 : 78 | 852 | 49806 | 1 : 58 |
| | 49806 | 1 : 58 | | 38891 | 1 : 57 | | 68230 | 1 : 80 |
| 741 | 45565 | 1 : 61 | 633 | 46735 | 1 : 74 | 741 | 30274 | 1 : 41 |
| | 30274 | 1 : 41 | | 30243 | 1 : 48 | | 47110 | 1 : 63 |

From these tables we gather the fact, that for the same weight of body the lungs vary within wide limits, and conversely, for the same weight of lungs the body varies within wide limits, the difference in more than one instance amounting to upwards of one-third. These facts, with others which might have been adduced, prove that for the same weight of body the lungs of the male are generally heavier than those of the female, and, on the other hand, that, for the same weight of lungs, the body of the female is often heavier than that of the male. In other terms, the lungs are proportionally smaller in the female than in the male.

The following table exhibits some of the more striking facts of the same kind in children after respiration.

### TABLE XVIII.

| Male. | | | Female. | | | Male & female compared. | | |
|---|---|---|---|---|---|---|---|---|
| Body. | Lungs. | Propor. | Body. | Lungs. | Propor. | Body. | Lungs. | Propor. |
| 39000 | 1344 | 1 : 29 | 41595 | 1390 | 1 : 30 | 41595 | 1390 | 1 : 30 |
| | 757 | 1 : 52 | | 780 | 1 : 53 | | 786 | 1 : 53 |
| 25485 | 1235 | 1 : 21 | 54585 | 950 | 1 : 57 | 31664 | 741 | 1 : 43 |
| | 664 | 1 : 38 | | 695 | 1 : 78 | | 1544 | 1 : 21 |
| 33981 | 1390 | 1 : 24 | 31664 | 1544 | 1 : 21 | 26258 | 1151 | 1 : 23 |
| | 880 | 1 : 39 | | 664 | 1 : 48 | | 664 | 1 : 40 |
| 36298 | 1544 | 1 : 24 | 30119 | 1313 | 1 : 23 | 25485 | 1235 | 1 : 21 |
| | 1004 | 1 : 36 | | 710 | 1 : 42 | | 541 | 1 : 47 |
| 37070 | 1853 | 1 : 20 | 32436 | 1544 | 1 : 21 | 27802 | 772 | 1 : 36 |
| | 1142 | 1 : 32 | | 494 | 1 : 66 | | 1158 | 1 : 24 |

The results of this table are still more striking than those of the preceding one, though they are such as we should naturally expect when, to the original difference of weight of the lungs and body before respiration, is added the variable effect of the process of respiration itself. In more than one of the instances adduced, the weight of the body remaining the same, the weight of the lungs in one child is twice as large as in another, and in one example more than three times as large. Such anomalies as these meeting us at the very threshold of our inquiry into the value of Ploucquet's test, are sufficient of themselves to shake our confidence in it, and there is little reason to expect that a more minute examination will re-establish it in our favour. It is not, therefore, so much in the hope of finding Ploucquet's test more useful than it now promises to be, as with a view of completing the task I have undertaken, that I continue this inquiry.

There is one fact worth observing, partly on its own account, and partly from its connection with the present inquiry, viz. that the weight of the body is considerably greater in still-born children than in children who have respired. This will appear from the following table, in which the weights of the body before respiration, and in children of one day old are compared. The numbers of observations employed in forming the table are as follows:

| | | | |
|---|---|---|---|
| Male before respiration, | 44 | After respiration, | 31 |
| Female do. . | 37 | do. . | 22 |
| Male and female do. | 96 | do. . | 63 |

## TABLE XIX.

| | Male. | | Female. | | Male and Female. | |
|---|---|---|---|---|---|---|
| | Before Respiration. | After Respiration. | Before Respiration. | After Respiration. | Before Respiration. | After Respiration. |
| Max. | 95,520 | 77,000 | 87,336 | 57,313 | 97,140 | 78,912 |
| Min. | 30,243 | 22,396 | 30,243 | 19,307 | 27,030 | 19,307 |
| Mean, | 52,461 | 43,527 | 50,831 | 38,821 | 51,685 | 44,266 |

The mean weight of the bodies of still-born children exceeds the mean weight of such as have lived one day by from about one-sixth to somewhat less than one-third. The natural inference from this fact is, that large children are most apt to perish in the birth. The bearing of the fact upon the value of Ploucquet's test is obvious; for on the supposition, that the weight of the lungs in the child who has lived one day, is so far increased by the process of respiration as to equal the weight of the lungs in the heavier still-born child,—a supposition which a glance at Table XI. will render highly probable,—then the increased weight of the body of the still-born child will have the effect of exaggerating the disproportion between the weight of the lungs and that of the body, and giving to the test a higher value than it deserves.

Another fact worth observing, in connection with Ploucquet's test is, that the weight of the lungs is subject to much greater variation than that of the body. Thus in still-born male children, at full time, the maximum weight of the body is 95520 grains, the minimum 30243; whilst the maximum weight of the lungs in the same children is 1800, and the minimum 360 grains. The variation in the weight of the lungs as compared with that of the body, is nearly expressed by the proportion 30 : 19. Nearly the same difference is observable in the body and lungs respectively in the female, and in the two sexes taken together. When respiration has continued one day, this proportion becomes for the male 32 : 21, for the female 4 : 3, and for the two sexes jointly, about 3 : 2. The influence of this fact on Ploucquet's test is not very important. By correcting the large variations in the weight of the lungs by the smaller variations in that of the body, it will bring the proportion existing between the two into somewhat narrower limits.

The facts which have just been adduced,—the great variation in the weight of the lungs, that of the body remaining the same; and the equal variation in the weight of the body, that of the lungs remaining the same; the disproportion in the weight of the body in still-born children, and in those who have survived their birth one day; and the great variations observed in the weight of the lungs both before and after respiration,—these facts would lead us to expect such variations in the proportion which the lungs bear to the body, as must effectually destroy all hope of any practical advantage to be derived from Ploucquet's test. The inferences drawn from these data are abundantly confirmed by the more careful examination, into which I am now about to enter. The several questions are discussed in the same order which has already been observed in examining the absolute weight of the lungs.

The first question is, what is the proportion existing between the weight of the lungs and that of the body in still-born infants at full term? For the solution of this question the numbers of facts employed are as follow: male, 44; female, 37; male and female, 96.

### TABLE XX.

| | Before Respiration. | | |
|---|---|---|---|
| | Male. | Female. | Male and Female. |
| Maximum, | 1 : 24 | 1 : 36 | 1 : 24 |
| Minimum, | 1 : 176 | 1 : 119 | 1 : 176 |
| Mean, | 1 : 52 | 1 : 62 | 1 : 56 |

In one case mentioned by Lécieux, the proportion was as low as 1 : 200; but in this instance, the lungs are stated to have been compressed. The proportion of 1 : 176 occurred in a case related by Devergie, in which artificial respiration had been employed. The proportion next greater than this is 1 : 81, so that 1 : 176 may be justly regarded as an exception to the rule. In the female the proportion next greater than 1 : 119, is 1 : 94. In those cases where the sex is not stated, there is one proportion as low as 1 : 99. The maxima and mean numbers confirm the statement already made, that the lungs are less developed as compared with the body in the female than in the male. The following table, corresponding with Table II. gives the proportion between the lungs and body at 6, 7, and 8, months of fœtal life. The number of observations employed is as follows: 6th month, male 7, female 6, male and female 13: 7th month, male 10, female 12, male and female 24: 8th month, male 17, female 12, male and female 34.

### TABLE XXI.

| | 6th Month. | | | 7th Month. | | | 8th Month. | | |
|---|---|---|---|---|---|---|---|---|---|
| | M. | F. | M. & F. | M. | F. | M. & F. | M. | F. | M. & F. |
| Max. | 1 : 35 | 1 : 19 | 1 : 19 | 1 : 27 | 1 . 25 | 1 : 25 | 1 : 27 | 1 : 27 | 1 :27 |
| Min. | 1 : 58 | 1 : 56 | 1 : 58 | 1 : 62 | 1 : 56 | 1 : 78 | 1 : 132 | 1 : 98 | 1 : 132 |
| Mean, | 1 : 39 | 1 : 40 | 1 : 39 | 1 : 40 | 1 : 38 | 1 : 41 | 1 : 46 | 1 : 44 | 1 : 45 |

From this table it appears that the proportion which the lungs bear to the body at 6, 7, and 8 months, is greater than at 9 months; in other words, that the lungs are proportionably more developed at the earlier periods of gestation than at the full term. The numbers in the table are merely approximations, as the facts are not sufficiently numerous to establish a true average.

The following table corresponds with Table III., and presents the maxima, minima, and mean results for the two sexes taken together at 6, 7, 8, and 9 months, and before respiration.

### TABLE XXII.

| | 6th Month. | 7th Month. | 8th Month. | 9th Month. |
|---|---|---|---|---|
| Maximum, | 1 : 19 | 1 : 25 | 1 : 27 | 1 : 24 |
| Minimum, | 1 : 58 | 1 : 78 | 1 : 132 | 1 : 176 |
| Mean, | 1 : 39 | 1 : 41 | 1 : 45 | 1 : 56 |

Having now examined Ploucquet's test in the still-born, I proceed to construct similar tables for children that have respired; and, in the first place, in respect of children that have lived one month or less. The number of observations employed in constructing this table is as follows: male 162; female 124; male and female 314.

### TABLE XXIII.

| | After respiration. | | |
|---|---|---|---|
| | Male. | Female. | Male and Female. |
| Maximum, | 1 : 19 | 1 : 19 | 1 : 19 |
| Minimum, | 1 : 132 | 1 : 96 | 1 : 132 |
| Mean, | 1 : 35 | 1 : 43 | 1 : 38 |

In the males the proportion next greater than 1 : 132 is 1 : 119; and the next in order, 1 : 80. In the case of the females, the proportion next above 1 : 96 is 1 : 85. On the other hand, the proportion next less than 1 : 19 is 1 : 20 for the male, and 1 : 21 for the female.

The following table corresponds with Table V., and exhibits the proportion between the weight of the lungs and that of the body at 6, 7, and 8 months respectively.

Number of observations: 6 months, male 5, female 10, male and female 15: 7 months, male 17, female 14, male and female 36: 8 months, male 19, female 18, male and female 40.

### TABLE XXIV.

| | 6th Month. | | | 7th Month. | | | 8th Month. | | |
|---|---|---|---|---|---|---|---|---|---|
| | M. | F. | M. & F. | M. | F. | M. & F. | M. | F. | M.&F. |
| Max. | 1 : 18 | 1 : 17 | 1 : 17 | 1 : 18 | 1 : 23 | 1 : 18 | 1 : 24 | 1 : 20 | 1 : 20 |
| Min. | 1 : 108 | 1 : 65 | 1 : 108 | 1 : 69 | 1 : 59 | 1 : 69 | 1 : 80 | 1 : 104 | 1 : 104 |
| Mean, | 1 : 30 | 1 : 34 | 1 : 33 | 1 : 41 | 1 : 35 | 1 : 38 | 1 : 36 | 1 : 36 | 1 : 36 |

The want of uniformity in this table may be attributed probably to the small number of observations employed in constructing it. The proportions 1 : 108 and 1 : 104, may be considered, perhaps, as exceptions to the rule, for the proportion next greater than 1 : 108 is 1 : 44; and the proportion next greater than 104 is 1 : 53.

Table XXV. exhibits the proportion between the weight of the lungs and that of the body, for the two sexes taken together, at 6, 7, 8, and 9 months.

TABLE XXV.

| | 6 months. | 7 months. | 8 months. | 9 months. |
|---|---|---|---|---|
| Maximum, | 1 : 17 | 1 : 18 | 1 : 20 | 1 : 19 |
| Minimum, | 1 : 108 | 1 : 69 | 1 : 104 | 1 : 132 |
| Mean, | 1 : 33 | 1 : 38 | 1 : 36 | 1 : 38 |

For the reasons already stated, when speaking of the absolute weight of the lungs; the numbers contained in Table XXIII. are insufficient for medico-legal purposes. To insure the accuracy required for such investigations, it is necessary to ascertain the proportion which the weight of the lungs bears to that of the body, when respiration has continued a larger or a shorter period. With this view I have made the following table, which corresponds with Table VII.

| | | |
|---|---|---|
| No of observations. | 1 hour and less; | male 9, female 8, male and female 27. |
| Do. | More than 1 hour, and less than 12. | male 9, female 8, male and female 19. |
| Do. | More than 12 hours, and less than 1 day. | male 8, female 7, male and female 16. |

TABLE XXVI.

| | Less than 1 hour. | | | 12 hours. | | | 1 day. | | |
|---|---|---|---|---|---|---|---|---|---|
| | M. | F. | M. & F. | M. | F. | M.&F. | M. | F. | M.&F. |
| Max. | 1 : 30 | 1 : 26 | 1 : 26 | 1 : 20 | 1 : 30 | 1 : 20 | 1 : 27 | 1 : 30 | 1 : 27 |
| Min. | 1 : 119 | 1 : 78 | 1 : 119 | 1 : 132 | 1 : 96 | 1 : 132 | 1 : 55 | 1 : 78 | 1 : 78 |
| Mean, | 1 : 50 | 1 : 42 | 1 : 51 | 1 : 51 | 1 : 56 | 1 : 53 | 1 : 38 | 1 : 44 | 1 : 39 |

The average values in this table agree with the averages in Table VII. They show that the weight of the lungs, as compared with the body, is somewhat greater where respiration has continued less than one hour, than where it has lasted twelve hours; but that when it has continued more than twelve hours and less than one day, it is considerably increased.

The following table, which is the counterpart of Tables VIII. and IX., shows the proportion which the weight of the lung bears to that of the body for the several periods mentioned in the table:—

## TABLE XXVII.

| Age. | No. of Obs. | | | Male. | | | Female. | | | Male and Female. | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | M. | F. | M.& F. | Max. | Min. | Mean. | Max. | Min. | Mean. | Max. | Min. | Mean. |
| 1 day, | 32 | 23 | 65 | 1 : 25 | 1 : 132 | 1 : 49 | 1 : 26 | 1 : 96 | 1 : 44 | 1 : 20 | 1 : 132 | 1 : 48 |
| 2 days, | 14 | 5 | 21 | 1 : 30 | 1 : 60 | 1 : 41 | 1 : 49 | 1 : 85 | 1 : 56 | 1 : 30 | 1 : 85 | 1 : 44 |
| 3 days, | 9 | 9 | 23 | 1 : 23 | 1 : 48 | 1 : 35 | 1 : 25 | 1 : 62 | 1 : 36 | 1 : 20 | 1 : 62 | 1 : 33 |
| 4 days, | 17 | 14 | 34 | 1 : 20 | 1 : 48 | 1 : 33 | 1 : 21 | 1 : 60 | 1 : 37 | 1 : 20 | 1 : 60 | 1 : 34 |
| 5 days, | 9 | 11 | 20 | 1 : 23 | 1 : 45 | 1 : 33 | 1 : 25 | 1 : 56 | 1 : 38 | 1 : 23 | 1 : 56 | 1 : 35 |
| 6 days, | 9 | 7 | 18 | 1 : 25 | 1 : 52 | 1 : 32 | 1 : 29 | 1 : 44 | 1 : 35 | 1 : 25 | 1 : 52 | 1 : 35 |
| 7 days, | 6 | 7 | 13 | 1 : 28 | 1 : 44 | 1 : 37 | 1 : 21 | 1 : 43 | 1 : 30 | 1 : 21 | 1 : 44 | 1 : 33 |
| 1 week, | 97 | 77 | 202 | 1 : 20 | 1 : 132 | 1 : 38 | 1 : 21 | 1 : 96 | 1 : 40 | 1 : 20 | 1 : 132 | 1 : 39 |
| 2 weeks, | 51 | 37 | 88 | 1 : 19 | 1 : 55 | 1 : 32 | 1 : 19 | 1 : 66 | 1 : 31 | 1 : 19 | 1 : 66 | 1 : 32 |
| 3 weeks, | 9 | 4 | 14 | 1 : 20 | 1 : 35 | 1 : 28 | 1 : 24 | 1 : 37 | 1 : 32 | 1 : 20 | 1 : 49 | 1 : 31 |
| 4 weeks, | 4 | 7 | 11 | 1 : 19 | 1 : 44 | 1 : 26 | 1 : 22 | 1 : 43 | 1 : 30 | 1 : 19 | 1 : 44 | 1 : 27 |

This table confirms the results deduced from Tables VIII. and IX., and shows that the weight of the lungs, as compared with that of the body, increases with the duration of respiration, and the consequent perfection of the respiratory process. The irregularities observable in the first part of the table may be fairly attributed to the small number of observations. These irregularities almost entirely disappear in the second part, where the observations are more numerous, and the periods of time and the intervals between them greater.

Having thus examined Ploucquet's test, both before and after respiration, I now proceed to compare the results obtained before respiration with those obtained after respiration. For this purpose I have arranged the following table, which is the counterpart of Table XI.

## TABLE XXVIII.

| | | After respiration. | | | |
|---|---|---|---|---|---|
| | Before respiration. | Less than 1 hour. | 12 hours. | 1 day. | 1 day and less. |
| Max. . | 1 : 24 | 1 : 26 | 1 : 20 | 1 : 27 | 1 : 20 |
| Min. . | 1 : 176 | 1 : 119 | 1 : 132 | 1 : 78 | 1 : 132 |
| Mean, | 1 : 56 | 1 : 56 | 1 : 53 | 1 : 39 | 1 : 48 |

This table places in a very forcible light the real value of Ploucquet's test. It shows how greatly its advantages have been exaggerated, and adds another example to the many already on record of the futility of theories grounded upon one or two facts. Instead of Ploucquet's proportion of 1 : 70 before respiration, and 1 : 35 after respiration, we have 1 : 56 before respiration, and 1 : 51 after respiration has continued one hour or less, and 1 : 53 when it has lasted twelve hours. Now it is precisely at this early period after birth that the crime of infanticide is most commonly committed; and to decide the question whether or not the child has breathed, we must make use of averages which differ so little as 1 : 56 and 1 : 53 or 51. Even in a case in which a child has been proved to have lived one day, we have no greater difference than 1 : 56 and 1 : 39, and this an average difference, with a wide interval between the extreme proportions. A glance at the table will show how little advantage can be gained by an employment of the extreme values as standards of comparison.

There now only remains to contrast the proportion existing between the weight of the lungs and that of the body at six, seven, eight, and nine months. This contrast will be formed by combining Tables XXII. and XXV.

### Table XXIX.

| | 6th month. | | 7th month. | | 8th month. | | 9th month. | |
|---|---|---|---|---|---|---|---|---|
| | Before resp. | After resp. | Before resp. | After resp. | Before resp. | After resp. | Before resp. | After resp. 1 day. |
| Max. | 1:19 | 1: 17 | 1:25 | 1:18 | 1: 27 | 1: 20 | 1: 24 | 1: 20 |
| Min. | 1:58 | 1:108 | 1:78 | 1:69 | 1:132 | 1:104 | 1:176 | 1:132 |
| Mean, | 1:39 | 1: 33 | 1:41 | 1:38 | 1: 45 | 1: 36 | 1: 56 | 1: 48 |

This table appears at first sight to confirm an observation already made by Devergie as the result of his own tables, viz. that the process of respiration is more completely established in the immature than in the mature fœtus. There can be no doubt that, both before and after respiration, the lungs of the immature fœtus bear a larger proportion to the body than they do at full term; but there is some room to doubt whether the process of respiration is more complete in the earlier periods. It is difficult, indeed, to make any comparison sufficiently exact to determine this question, for the duration of respiration in the immature children varies greatly, some having lived some hours, others some days, and the observations are not sufficiently numerous to allow of minute subdivision. On comparing, however, the results for 6, 7, and 8 months, with those obtained for children at full term, who have lived one month or less, we find that the averages are 1 : 33, 1 : 38, 1 : 36, and 1 : 38, respectively. Hence there is some slight ground for believing with Devergie, that the process of respiration (as far as the increased weight of the lungs may be considered a test of more perfect respiration) is more complete in the early periods of gestation, but, as the difference in the proportion before and after respiration is nearly the same for 6, 7, 8, and 9 months, we may consider this observation of Devergie to stand in need of further confirmation.

The observations which have been already made when speaking of the absolute weight of the lungs, are fully borne out by the facts just adduced in illustration of Ploucquet's test. Both orders of facts have an important bearing on a physiological and medico-legal question, which are closely connected, and are commonly discussed together. The physiological question virtually involves the practical one, but both may be decided by the same facts. The physiological question is this,—What effect has respiration on the supply of blood to the lungs? To what extent does it affect the weight of these organs? is the practical question.

A few observations on each of these questions in the order in which they are proposed, will bring this essay to a conclusion.

And, *first*, with regard to the physiological question—What effect has respiration on the supply of blood to the lungs? Few facts in physiology are better established than the intimate connection existing between the functions which an organ performs, and the quantity of blood which it receives, and, as a general rule, it may be stated that the more important these functions, the larger the supply of blood. It is but natural, therefore, to expect that, where an organ has no functions to perform, it will receive no more blood than is necessary to keep it alive, and preserve it as a part of the system to which it belongs. Now this is precisely the case with the fœtal lungs. Until respiration is established they have no function to perform, and it has been, therefore, somewhat hastily assumed that they receive a very limited supply of blood. This reasoning is specious but not sound; for there is no real analogy between the lungs and those organs of the body which are dependent upon their supply of blood for the due performance of their functions. The rule which applies to secreting organs, does not hold good when it is extended to viscera, which merely serve as reservoirs of blood. Now, the peculiar function of the lungs is that of exposing a large quantity of blood to the atmospheric air. Regarded in this light, there seems no sufficient reason for assuming that the lungs contain much less blood before respiration than after respiration. If a free flow of blood through the lungs be necessary to the support of life when respiration is once established, a full supply of blood seems equally necessary when that important function is about to be called into play. Nor does the peculiar character of the fœtal circulation place any great difficulty in the way of the supposition that the lungs, even before respiration, contain a considerable quantity of blood; for though the blood be not circulated through the lungs so rapidly before as it is after respiration, there is no physical obstacle to an accumulation of blood in the lungs preparatory to the establishment of the respiratory process. But it is not by *à priori* reasonings that such questions as this can be satisfactorily decided. In this, as in all other cases, an appeal to facts is the only means of coming to a decision. Now the facts contained in the tables prove beyond a doubt that the process of respiration does in some degree increase the weight of the lungs. But this increase of weight is so inconsiderable, as to militate strongly against the general opinion, that the fœtal lungs are nearly destitute of blood. It follows, therefore, that though the process of respiration does cause the lungs to receive an increased quantity of blood, it finds them already amply supplied with it; for there can be no doubt that the weight of the lungs before respiration very greatly exceeds the weight of their structure alone; a fact which can be accounted for only on the supposition that their vessels contain a very large quantity of blood.

This fact being established beyond the reach of doubt on the authority of the tables, a question arises, whether this large quantity of blood is always contained in the lungs, or merely enters them during the birth? There are no precise data for solving this question; but it seems highly probable, that, during or immediately after the birth of still-born children, the lungs may be gorged with blood. On the supposition that ineffectual efforts to respire are made by many still-born infants, it will not be difficult to explain the gorged state in which their lungs are sometimes found. These efforts consist in a raising of the ribs, and depression of the diaphragm, which tend to leave a vacuum in the chest,—a vacuum which must be continually prevented by the enlargement of some of the contents of the chest. Now the lungs are organs peculiarly susceptible of this increase of size, and will admit of easy expansion by the blood, which the heart is continually throwing out. It is not unreasonable, therefore, to suppose that, when these efforts to respire prove ineffectual in consequence of some impediment to the entrance of the air by the mouth or glottis, the blood should find its way into the lungs, instead of the air, which is excluded. This supposition derives strong confirmation from facts, which must have fallen under the observation of all those who have been in the habit of inspecting the bodies of infants. Thus in one case which I had an opportunity of examining, the lungs, though in a fœtal state, throughout, with the exception of three or four small points on the upper lobe of the right lung, were gorged with blood, and weighed no less than 1178 grains Troy. Here the child had given three distinct gasps merely, and the air had scarcely found its way into the lungs at all; but, nevertheless, they were found full of blood. I have observed a similar turgescence of the lungs in cases of still-birth. There is a close analogy, indeed, between the effect of abortive efforts at respiration in the infant, and similar abortive efforts in the adult. Thus in cases of suffocation, the efforts at inspiration have the effect of gorging the lungs with blood, though the air is prevented from entering, and some of the heaviest lungs of infants on record are those which have perished by suffocation. One instance of this sort has already been cited. But though it cannot be doubted, that the lungs do receive blood in considerable quantity before respiration takes place, yet the facts collected prove that the quantity is increased by the act of respiration, at first but slightly, after some hours or days more considerably. The tendency of respiration, therefore, is to add to the weight of the lungs; but, as respiration often continues for hours or days, nay, even for weeks, in a very imperfect manner, the full effect of respiration is not produced in the early periods of life; and comparatively few cases occur in which the lungs are found completely and universally permeated with air. On a future occasion I propose discussing this subject by the aid of single facts,—I content myself at present with more general results, and the conclusions which my reading or experience has forced upon me. The following general proposition seems to be warranted by the results of the tables and by experience of individual facts.

*The fœtal lungs contain a considerable quantity of blood, and that quantity is not greatly increased by the process of respiration.*

One other fact established by the tables is too interesting to be passed over in silence; viz. that, whereas the weight of the lungs is increased on the first establishment of the respiration, it is diminished when respiration has continued more than one hour, and less than twelve, and again increased when the child has lived more than twelve hours, and less than one day. This, though it appear paradoxical, may really admit of explanation, if it be allowed that the first efforts to respire, whether successful or not, are of necessity accompanied by an engorgement of the lungs, which passes off as the process becomes more completely established; and that, when the respiration has continued for a still longer period, the lungs receive a still larger quantity of blood, and a still further increase of weight.

These observations are open to the obvious objection, that the facts from which the tables are formed are not strictly comparable, nor sufficiently numerous. This objection, of which I am far from denying the force, may be met by a further appeal to individual facts, which I reserve for a future occasion.

If the facts are allowed to be sufficiently numerous, the practical question with regard to the value of the absolute weight of the lungs, and their weight as compared with that of the body, (Ploucquet's test), as tests of respiration, is already decided; and the following proposition will present a summary of the results obtained. *The static lung tests are utterly useless for all practical purposes, and ought not to be relied on in medico-legal inquiries.*

In a future essay I propose to examine the hydrostatic lung test, and to detail one or two cases of some interest which have come under my own observation.

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## Art. III.—*The influence of the Heart on the Motion of the Blood.* By G. Calvert Holland, M. D., Physician to the Sheffield General Infirmary.

It is strongly contended by one class of physiologists, that the action of the heart is transmitted throughout the sanguiferous system, and is, moreover, the sole cause of circulation. By another it is regarded as terminating at the capillaries; and other agencies are imagined to be brought into operation by which the blood is enabled to perform its extended revolution. A third considers the heart as influencing the circulation beyond the capillaries, but attributes the motion of blood in the great veins principally to the suction power of the right auricle, or to changes in the capacity of the lungs. Amidst such conflicting opinions, resting on experimental researches, the mind is confused in attempting to separate truth from error. If high authorities be permitted to exercise an undue influence, the inquiry is at once arrested or perverted from its legitimate course, or, if the mind yield an assent to apparently commanding results, without passing them through the ordeal of severe analysis, every progressive step is one of vacillation and doubt. The same degree of talent, acuteness, and experimental fact is adduced in support of these various doctrines, and hence the perplexity in endeavouring to assign to each its just share of truth.

The decision will not be materially facilitated by the institution of new, nor the repetition of old experiments. These are not defective from a want of ingenuity or skill either in the conception or the execution. Several of the most important are objectionable, the principles on which they are conducted being incapable of furnishing correct views; or they have not been studied with sufficient attention in respect of the changes produced by them in the condition and relation of the vital powers; and hence the results to which they have led, have been false, partial, or of questionable utility, as data to direct and enlighten the inquiry. The attainment of truth on this subject is opposed by obstacles and difficulties which are by no means easy to surmount. To ascertain the force of any propulsive power, exerted under ordinary circumstances, and in co-operation with other powers, the individual and conjoint influence of which is exceedingly liable to be aggravated or destroyed by our direct interference, is a task which can scarcely be undertaken with the hope of perfect success.

The calculations, however elaborate, can only be an approximation to the truth. Let the mind for a moment consider the object of the inquiry, viz. to determine, by experiment, the force or impulse of the heart exerted on the motion of the blood, and let it also take a dispassionate survey of the intricacies and perplexities of the question. The nature of the soil proposed to be turned up ought to be well understood. An important distinction has been lost sight of in the prosecution of this subject. The force of the heart, imagined to be established by experiment, has been regarded as identical with that in operation in the natural or undisturbed conditions of the powers of life. These, however, are two questions exceedingly dissimilar, and by no means presenting the same difficulties of investigation. If it be admitted with physiologists generally, that circulation is maintained by the heart, the elasticity of the vessels, the contractility of the capillaries, the changes in the capacity of the chest, or the two acts of respiration, it may be shown, that, in endeavouring to measure by means of experiments, which mutilate the parts examined, the influence of any one, but especially that of the heart, the powers of the whole, and their relation to each other, may be seriously deranged.

1. One source of fallacy may be the following:—In preparing to lay bare important blood-vessels, the mental suffering and agitations of the animal greatly excite the action of the heart, give it, indeed, a degree of energy and force which it does not ordinarily exercise. Whatever may be the result obtained under such circumstances, it is manifest that it is an exaggerated estimate. The amount of the impulse usually co-operating still remains to be discovered; and will long be one of the mysteries of nature.

2. If, by our interference, the character of the current is materially changed, the powers by which it is propelled in health may be increased in activity, enfeebled or annihilated; and hence, experiments producing this effect can lead to no accurate results. It will be found, in the course of this inquiry, that physiologists, in their experimental researches into the powers which move the blood, have calculated none of these difficulties, but have pursued their course, as if they had to deal with dead or inorganic substances.

3. The mind should be impressed with this principle, that all vital actions are regulated by laws, delicate and finely adjusted; and that to touch, with a rude hand, matter over which they preside, is to disturb the harmony and sympathy characterizing their operations. Were the physiologist, in his experimental researches, to feel the full force of this truth, reflection would often take the place of action;—boldness and decision would be converted into hesitation and doubt; and immature theories would frequently assume the modest form of hypotheses, greatly to the

advantage and progress of science. In none of the numerous experiments performed to determine the propulsive power of the heart were the consequent disturbed conditions of capillaries, and of the arterial system generally, even suspected, much less taken into account. The necessity of appreciating these is too evident to require illustration.

All the vessels of the body may be divided into two great classes; those whose office it is simply to convey fluid from one part of the system to another, and those in which the essential operations of life are carried on. The contents of the arteries, belonging to the first class, are indisputably urged forward by the heart; but there is no evidence unequivocally demonstrating that the motion of blood in capillary vessels is solely indebted to it. The existence and action of a *vis a tergo* is no proof; nor do the researches of physiologists clearly establish the fact. The circulation peculiar to the liver will scarcely on patient consideration be ascribed to the impulse of the left ventricle. The blood, before it arrives at that important viscus, has passed through arterial and venous capillaries; and it is again distributed to, and collected from such vessels, previously to entering the *vena cava.* Can the heart be regarded as capable of transmitting its agency through four series of capillaries, one arterial and three venous? The effect would not only require an extraordinary degree of motive power, but manifest distension of the multitude of vessels extending from the left ventricle to the hepatic veins, without which no such central influence could be transmitted. The consideration of the varying conditions of the sanguiferous system and the phenomena of capillary circulation, as exhibited in the field of the microscope, renders it difficult to entertain such a doctrine. The abdominal vessels, and especially those of the liver, are often greatly congested. The accumulation of blood is evident from local and constitutional symptoms, which can scarcely be misinterpreted. A condition of this kind must be a barrier to the transmission of any central influence. The obstacles opposed to its conveyance are clearly great. It must also be kept in mind, that while on the one hand, the mass of blood to be moved is accumulating, on the other, the power by which it is supposed to be impelled is diminishing in force in a much greater ratio; and hence the doctrine, that the circulation in the last series of capillaries is acted upon by every contraction of the heart, is certainly fraught with difficulties. The motion of blood in capillaries, which has been minutely observed and accurately described by writers, does not afford evidence in favour of the prevailing views. The globules, which are the only connecting links between the columns of blood in the arteries and veins, are not characterized by a regular progressive march. At one moment they retrograde;—at another they appear to revolve upon their axis, or move forward only by fits. Does it seem probable that these globules are the bearers of the influence of the heart to the masses of fluid in the great veins, impelling them in their course to the right auricle? This is the doctrine taught and generally believed. Were this the proper occasion for adducing all the evidence illustrative of the opinion which is here advocated, the way in which circulation is carried on in the fœtus, and especially in those cases in which the heart is wanting, would furnish unquestionable facts bearing upon the subject.

Our object at this time, however, is to analyze important experiments, which, from their high authority and apparent conclusiveness, are imagined to establish the doctrine which is here combated. Those of Magendie have the first claim on our consideration. His acknowledged ingenuity and tact, and the boldness and originality of his views, justly entitle him to this distinction. The following experiment, which is detailed in his own words, is universally admitted to demonstrate the influence of the heart on venous circulation. It is quoted by all writers in corroboration of this fact; and no one has presumed to invalidate its force by the discovery of any defect in its conception or execution.

"After having passed a ligature round the thigh of a dog, as I now described, that is, without including the crural artery or vein, apply a ligature separately upon the vein near the groin, and then make a slight opening in this vessel. The blood will immediately escape, forming a considerable jet. Then press the artery between the fingers to prevent the arterial blood from reaching the member. The jet of venous blood will not stop on this account; it will continue some instants; but it will become less and less, and the flowing will at last stop, though the whole length of the vein is full. If the artery be examined during the production of these phenomena, it will be seen to contract by degrees, and will become completely empty. The blood of the vein then stops; and at this period of the experiment, if you cease to compress the artery, the blood injected by the heart will enter, and as soon as it has arrived at the last divisions, it will begin to flow again at the opening of the vein, and by little and little the jet will be established as before."

The same experiment, very recently performed by him, is also introduced here, in consequence of suggesting some important remarks. "When I compressed the trunk of the crural artery, the stream from that vein diminished, as though it would soon be arrested altogether. On the contrary, when the artery was freed from pressure, and the passage of blood through the smaller vessels was unimpeded, the jet from the vein returned with its original. I repeated this, moreover, several times with the same effect,—at least with the effect of diminishing the flow of blood from the vein, for I do not know why I could not succeed in arresting it altogether. The experiment shall be repeated more perfectly. What you have seen, however, is sufficient to establish the fact that the influence of the heart is extended to the venous circulation."

The experiment may be shown to afford no satisfactory evidence in favour of the doctrine insisted upon.

Were the blood in the vein circulating, as he contends, from the direct impulse of the heart, it would clearly be urged forward by every contraction of the left ventricle, and would, necessarily, be almost at once arrested on its cessation : but, according to the statement of Magendie, this is not the case. On making a slight opening in the vein, he says, " The blood will immediately escape, forming a considerable jet. Then press the artery between the fingers, to prevent the arterial blood from reaching the member; the jet of venous blood will not stop on this account, it will continue some instants; but it will become less and less, and the flowing will at last stop, though the whole length of the vein is full." It is here distinctly admitted that the flow of venous blood was not insantaneously arrested, on interrupting the action of the heart; but continued for some instants. The experiment is intended to prove that the jet is the effect of the direct impulse of the heart, but the contrary is established by it. The gradual diminution of the jet, until at length it stops, is a result which might have been anticipated from the altered conditions of the circulation. The blood flows from the punctured vein, as long as the capillaries receive arterial fluid, but necessarily ceases, when this fails to be supplied. That these vessels are destitute of blood, is evident from the crural artery being observed completely empty.

The fact on which Magendie dwells as peculiarly striking and unexpected is, that at last blood ceases to flow, though the whole length of the vein is full. There is nothing extraordinary or remarkable in this circumstance, nor does it indeed prove, as he imagines, that the column of venous blood is at rest, from the action of the heart being interrupted. Did the fact establish the conclusion which he draws, it ought unquestionably to be perceived immediately on arresting the motion of blood in the artery, which does not occur. The venous column is not at rest until the whole length of the artery is empty. This condition, though inexplicable on the reasoning of Magendie, may at once be satisfactorily accounted for. As long as the capillaries connecting the artery and vein are furnished with blood, they are enabled to propel their contents into the latter vessel, but the power they exercise will clearly become feeble and inefficient in proportion to the diminution of the supply, until at length it entirely ceases.

The further remarks of Magendie confirm this explanation. "At this period of the experiment," he says, "if you cease to compress the artery, the blood injected by the heart will enter, and as soon as it has arrived at the last divisions, will begin to flow again at the opening of the vein, and by little and little, the jet will be established as before." He here distinctly states, that the blood does not flow from the vein until it has reached the last divisions, that is, until the capillaries are abundantly furnished, and then the jet is established by little and little, and not at once, which would be the case, were the capillaries already possessed of blood. Were they in this condition, the impulse of the heart ought to be transmitted immediately to the venous column, on the removal of pressure from the artery. As this physiologist is partial to illustrations of vital phenomena, derived from physical science, we will offer one for his consideration. Suppose a series of inorganic tubes of the size of the principal arteries and veins, and connected by a multitude of exceedingly small ones, and the whole filled with water. Every additional quantity injected into them, by means of a piston, would clearly displace an equal amount from the extremities. The force of the piston would be perceived as soon as the vessels were full. The projection of the fluid would not be gradually established, but at once, nor would its cessation be by little and little, if the propelling cause were arrested. In this experiment, it is not necessary to take into consideration the modifying influence of the vessels through which the blood flows. The action of the heart only solicits attention, and, therefore, this illustration drawn from physical science is not very remote in its application.

The time required, in the experiment of Magendie, for the re-establishment of the jet, proves, as just remarked, that the mass of vessels, from the distended vein to the point of the compressed artery, are empty; and though the jet is ultimately formed, it affords no evidence of the direct action of the heart. The phenomenon exists for some instants after the influence of this organ is arrested, and is not perceived for some time after the removal of all pressure from the artery. This experiment, recently performed by the same physiologist, was not successful. He acknowledges, that in compressing the artery, the flow of blood from the vein was only diminished, and not arrested. The reason assigned for the failure is not strictly philosophical. The dog, the subject of experiment, is stated to have been weak from the previous injection of water into the veins. Is it then to be inferred, that when the animal system is extremely debilitated, blood moves in the veins without the assistance of the heart, and that when vigorous, it circulates from the impulse imparted by this organ? If it be a law of the system, that venous blood is urged forward by the heart, its influence ought to be as necessary in one state of the vital powers, as in another. Indeed, it seems most required when the vital energies are weak; for at this time, the blood is less capable of stimulating the mass of vessels in which it circulates. Such is the experiment adduced to prove that the motion of the venous blood is chiefly derived from the action of the heart. Bichat contends that the capillaries are the principal cause of its motion. No experiment .which seriously deranges the functions of the circulatory system can possibly determine the question. In the procedure of Magendie, how are the capillaries circumstanced? In pressing upon the artery, until the stream ceases to flow from the punctured vein, they are unquestionably deprived of blood; and therefore, with what force of reasoning can it be asserted that venòus circulation is unaffected by them? Whether the motion of blood in these vessels is derived from the heart or not, it will unquestionably be modified by every interruption or disturbance of the arterial current.

A little further consideration of the experiment of Magendie will show that it is quite incapable of affording any accurate results. He proposes to ascertain the cause of the motion of blood in the veins; but, in attempting to accomplish this, he completely destroys the ordinary conditions of the arteries—capillaries and veins. The natural relations which these vessels bear to each other no longer exist. Previously to pressure being applied to the artery, the blood flowing from the punctured vein, is a circumstance alone quite sufficient to invalidate the conclusions deduced by him. Its mode of circulation in the undisturbed state of the animal system is very different. In the one case, there are obstacles to be overcome, or its motion is constantly liable to interruptions from causes influencing the columns of blood before it; in the other, there are no impediments whatever, but indeed its flow is greatly accelerated by the removal of the ordinary causes of retardation. To facilitate its escape in this manner, is to modify the current both in the capillaries and arteries, as if the pressure in these vessels was increased. The dilatation of the cavities of the heart, in all probability, accelerates the flow of blood towards them. It has a ready means of escape from the pressure or tension by which it is influenced, at the regular successive periods in which the partial vacuum occurs. The difference between the resistance of the atmosphere and the contents of the vessels, to the circulating fluid, is manifestly great. Its escape from a divided vein is accelerated and violent, not in consequence of the exercise of an extraordinary force *a tergo*, but from the removal of all obstacles to its flow. The atmosphere, compared with the ordinary resistances to which it is exposed, may be viewed in the light of a vacuum, towards which the circulating fluid will direct its course with impetuosity. When the progress of the blood is interrupted in the artery, it is still admitted to flow with undiminished force from the vein. This cannot be ascribed to the direct impulse of the heart, for this is clearly arrested. The capillaries, indeed, convey forward the fluid as long as they are supplied, and it continues to escape from the vein until the whole length of the artery is empty. From these remarks, it is evident that this celebrated experiment affords little, if any, precise information on the cause of venous circulation, or its degree of dependence on the heart. If it prove any thing, it establishes the independent action of the capillaries.

The objections which are here urged against the experiment of Magendie, apply with equal force to the reasoning on the effects of venesection and syncope, which are referred to as evidence of the influence of the heart on the circulation. The former, when carried to a serious extent, enfeebles, and the latter often arrests the action of this organ. They both disturb the functions of the capillaries, almost as much as pressure on the artery. Syncope is not an instantaneous effect, but is gradually produced. When occurring in venesection, it is preceded by a feeling difficult to define. Previously to any complaint of uneasiness, the countenance changes colour, and occasional deep inspirations are observed. The heart at this time is struggling to carry on the circulation, but fails in the attempt. Its action becomes weaker and weaker, until at length it virtually ceases. From the first moment of uneasiness, to the cessation of its contractions, the blood is gradually leaving the arterial, and accumulating in the venous system; and in all probability the larger arteries are nearly empty when syncope takes place. One unquestionable office of the capillaries is to convey forward the blood transmitted to them; and, as long as the supply is abundant and regular, the exercise of this function will necessarily influence the circulation in the veins. When this supply is no longer furnished, as in syncope, this influence ceases to be exerted, and the tension of the whole of the sanguiferous system is so far diminished, that the vital fluid has no tendency whatever to escape from the punctured vein. Nor is the jet usually re-established on the return of the action of the heart. The blood may trickle from the external opening, but it is not projected with any force till long after recovery. From these considerations, it is evident that the capillaries and the great veins are in a condition similar to that produced by pressure on the artery in the experiment of Magendie; and hence the explanation which was given of the phenomena in one case, may, with much truth, be employed on the present occasion.

The dependence of the capillaries on the heart has also been inferred from the facility with which injections are made to pass from arteries into veins. The force employed is stated to be considerably less than that of the left ventricle. There is, however, no just estimate of this force. The calculations of Borelli, Keill, Hales, and their followers, in the same inquiry, Bernouilli, Sauvages, Jurin, Bryan Robinson, and others, exhibit the greatest discrepancy. Nor do the calculations of modern physiologists by any means harmonize. Between those of Arnott, founded on the experiments of Hales, and the recent calculations of Poiseuille, deduced from his own experiments, there is a difference of above fifty-five pounds.

It has already been remarked that the arterial blood is circulated principally by three forces: the direct contraction of the left ventricle, its previous impulses, and, to a slight degree, the elasticity of the arteries. But as these are not acting at the same moment, the energy with which it is propelled necessarily varies with the causes in operation. The alternation in the play of these forces is well calculated to allow the capillaries to exert their contractile powers. Were they in a state of extreme tension, they would be incapable of acting upon their contents; and hence, would be altogether passive in the process of circulation. But what is the condition of these vessels, when water is injected, to ascertain the facility with which fluids are transmitted through them? From the point of the artery, to which the apparatus is applied, to the corresponding vein, the capillaries intermediate are necessarily in a state of excessive tension, so that the fluid injected, if not irritating in its nature, will traverse them with almost the same facility, that it would inorganic tubes; a condition incompatible with the exercise of their functions; and consequently the results of the experiment cannot be adduced as illustrative of the propulsive power of the heart. The experiment admits of one positive inference only, viz. the direct communication between arteries and veins. The various powers which facilitate or retard the motion of blood in the animal system, entirely cease on the extinction of life; and, therefore, the injection of fluids through a series of vessels destitute of vitality, affords no estimate whatever of the contractile force of the left ventricle, or, indeed, any comparative approximation to a correct calculation.

According to Arnott, " The arterial tension of four pounds to a square inch, marked by its supporting, in a tube connected with the arteries, a column of blood eight feet high, is produced by the action of the heart; but as the heart, while injecting the blood against this resistance, has, moreover, to overcome the inertia, both of the quantity injected, and of the mass, in the great artery, first moved by the injection; as also the elasticity of the vessel yielding to momentary increase of pressure; the heart must act with a force of about six pounds on the inch. Now, as the left ventricle of the human heart, when distended, has about ten square inches of internal surface, the whole force exerted by it may be about sixty pounds."* This calculation is founded on the data supposed to be established by Hales. The area of the left ventricle, and the height to which blood would rise in a tube fixed to the carotid or any large artery, being first ascertained, and then multiplying the square inches of the area, by the height of the column, the pressure of the ventricle is imagined to be determined. An examination of the impulse of the heart certainly does not convey the idea of any extraordinary force being exerted. It would never be imagined that this power was equal to sixty pounds.

The opinion and calculations of this inquirer always demand respectful consideration. As they are distinguished by great acuteness, and intimate knowledge of physical science, it may perhaps be regarded as presumptuous to question his authority. If the subject were one to which the principles of physical science could be justly applied it would be bold in the extreme to hazard an objection. But when the principles of an exact science are employed to elucidate the mysteries of one which perplexes and confounds, by the variety and intricacy of the operations crowding the field of observation, the calculations by which they are estimated can scarcely be regarded as partaking of the character of the science from which they are derived. There can be nothing positive in the deductions, or conclusive in the reasoning by which they are evolved, when the data on which they are founded are never clearly comprehended;—when, indeed, the phenomena investigated have all the complex and elusive properties of life, blended with and united by sympathies which no human ingenuity can seize, or can determine the amount of their several influences. Were the impulse of the left ventricle equal to a force of sixty pounds, it would necessarily follow that this weight would be raised if it were applied to any principal artery. It has, however, been ascertained by experiment, that a few pounds weight are sufficient to intercept the current of arterial blood. If the doctrine of Magendie and Poiseuille were correct, that the tension in all arteries is the same, according to the calculations of Arnott, it would require a pressure equal to sixty pounds to arrest the current in the radial artery. The pressure of a few ounces is sufficient for the purpose. Will it not be admitted, that any given weight, which altogether interrupts the course of a current, is greater than the force by which it is propelled? Poiseuille has regarded the subject in this light, and has employed his hæmadynamometer to determine the impulsive power of the heart. The objections to its use, specified in the course of this inquiry, do not apply equally in this instance. It has been shown that the instrument destroys, when fixed to an artery, all the forces ordinarily engaged in the circulation, except that of the heart. It is, however, questionable whether these forces be equally annihilated in all cases. The results will be liable to be greatly modified by the size of the animal—the importance of the artery experimented upon, and the amount of derangement induced in the powers of life. Previously to pointing out these probable sources of fallacy, we present the following table of experiments, and the accompanying remarks of Poiseuille.

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* Elements of Physics or Natural Philosophy. By Neil Arnott, M. D.

| Names of the Animals. | | Weight of the Animal. | Weight of the Heart. | | | Pressure obtained. |
|---|---|---|---|---|---|---|
| | | liv. | liv. | onc. | gros. | Millim. |
| 1. Dog. | 1st March | d | d | 6 | 5 | 148.68 |
| 2. Dog, | 15th March | d | d | 3 | 7 | 147.36 |
| 3. Dog, | 16th March | d | d | 3 | 7 | 141.45 |
| 4. Dog, | 19th March | 34 | d | 4 | 6 | 157.39 |
| 5. Dog, | 23d March | 42 | d | 4 | 1 | 145.75 |
| 6. Dog, | 8th April | 28 | d | 5 | 6 | 166.60 |
| 7. Mare, | 14th April | d | 6 | 12 | d | 146.68 |
| 8. Horse, | 14th April | d | 4 | 6 | d | 147.00 |
| 9. Dog, | 25th April | 86 | d | 7 | 2 | 179.04 |
| 10. Horse, | 28th April | d | 5 | d | d | 157.25 |
| 11. Horse, | 1st May | d | 5 | 6 | d | 154.33 |
| 12. Mare, | 1st May | d | 3 | 6 | d | 182.05 |
| 13. Dog, | 17th May | 19 | d | 2 | 6 | 141.40 |
| 14. Dog, | 18th May | 41 | d | 6 | 6 | 171.14 |

"In stating the pressure given by the hæmadynamometer, we have not taken into account either the atmospheric pressure or the temperature at the periods of the various experiments; circumstances which may indeed affect the height of the column of mercury; but which are, if we may use the expression, null as to the object which we have in view.

On examining this table with some degree of attention, one is surprised to find that a heart of 3 ounces 7 gros (No. 2.) gives a pressure equal, within a few millimetres, to that given by hearts respectively of 4 ounces 1 gros, of 6 pounds 12 ounces, or of 4 pounds 6 ounces; and one is no less astonished to find that a heart (No. 9.) of 7 ounces 2 gros gives a pressure greater than that afforded by hearts of from 5 pounds to 5 pounds 6 ounces, of 4 pounds 6 ounces, of 6 pounds 12 ounces.

The pressures obtained, then, are not in relation to the respective weights of the hearts; hence may we not conclude that the variations observed in the pressures (variations extending only from 140 to 180 millimetres) are attributable to circumstances of the individuals, such as age, sex, state of health, &c.; circumstances which we are not in a condition to appreciate? This being the case, are we not right to assume it as a general consequence, *cæteris* *paribus*, that the pressure given by an artery of an animal of from 300 to 400 kilogrammes, of a horse for example, would be the same as that given by an artery of an animal a great deal less, for instance of a dog of 10 kilogrammes?

" Thus, if we take two arteries of the same calibre, the one in a dog, the other in a horse, in spite of the enormous difference in the weight of these animals, the total forces which move the blood in each of these two arteries will be exactly equal. Further, if considering the adult state of the man, the dog, the horse, we take in each of them an artery of the same calibre, as these arteries are of the same thickness, they are destined, generally speaking, to nourish the same mass of parts. Well, then, there is no reason to think, *cæteris paribus*, that the force which moves the blood in one of these arteries is different from that which moves it in the others. We shall therefore consider these forces as identical."

He further remarks, " Now, we shall say, since a molecule of blood, taken at any point of the arterial system of man, is moved with a force capable of forming an equilibrium to a column of mercury of a known height, in order to obtain the force which corresponds to an artery of a given calibre, we shall only have to take its diameter; and the weight of a cylinder of mercury, whose base shall be the circle given by this diameter, and the height that of the column of mercury obtained, will be the total static force with which the blood moves in that artery; that is to say, if a partition were placed there, and held in its place on the side opposite to the course of the blood by a force equal to this weight, the blood would cease to move in the artery.

" We may then establish this general theorem, that the total static force which moves the blood in an artery is exactly in the direct ratio of the area presented by the circle of that artery, or in the direct ratio of the square of its diameter, whatever be the space which it occupies.

" As an application of these principles, let us examine, for example, the force with which the heart propels the blood in the aorta of man, and in some other arteries, for instance, the radial.

" In a man, aged 29, we found the diameter of the aorta, on a level with the sigmoid valves, equal to 34 millimetres under the pressure of 160 millimetres of mercury; we obtained for the area of the circle 908,2857 millimetres square, which, multiplied by 160 millimetres (the height which we take between 140 and 180 millimetres), give us 145325.72 cubic millimetres of mercury, the weight of which is equal to 1971.77936 gram. = 1.971779 kilogr. or 4 pounds, 3 gross, 43 gr. the estimate of the total static force of the blood in the aorta at the moment of the heart's contraction.

" In a man, aged 46, the aorta under a pressure 140 millimetres of mercury, gave us 35 millimetres of diameters. Taking the pressure, not of 160 millimetres, as in the preceding case, but of 140 millimetres only, there results 1.828288 kilogr. or 3 pounds, 11 ounces, 6 gros, 4 grains, as the force of the blood in the aorta at the instant of the heart's contraction."

According to the procedure of this physiologist, the force of the human heart is about four pounds. The evidence on which the estimate is founded is not strictly experimental. The height to which mercury ascends in the instrument fixed to the artery of an animal, on the contraction of the left ventricle, is the only fact determined. In attempting to show its applicability to solve the interesting question—the force exerted by the human heart, every step of the inquiry is assumed, and consequently the conclusions can be received only as probable.

It is always desirable to define clearly the amount of our knowledge on any important point.

He lays it down as a fact, that blood in arteries of the same size, in different animals, is propelled by equal forces. This, however, can only be stated as an opinion, the accuracy of which cannot possibly be ascertained by any experimental researches which disturb the natural conditions of the circulation. On reference to the table presented by Poiseuille, it will be observed that the pressure of the heart in the dog, No. 14, is 171,14 millimetres, while that in the horse, No. 11, is only 154,33 millimetres, and, with one exception, the dog indicates as great a pressure as the horse throughout the series of experiments.

In the interesting researches of Hales, tubes fixed to any of the principal arteries, in the horse and dog, give very different indications. In the former, blood regularly rose to the height of nine feet, but in the latter seldom exceeded four. In twenty experiments on dogs, in six only did the blood exceed this height, and in five it was considerably below it. The ordinary contractile force of the heart cannot be determined either by the tubes of Hales or the hæmadynamometer of Poiseuille. If the artery, to which either is attached, be important and in the immediate vicinity of the heart, the pressure indicated, not only in this vessel, but throughout the arterial system, will be aggravated, because the heart is excited to inordinate exertion. It is indeed stimulated by the sufferings and constrained position of the animal to the highest possible degree of contraction. In confirmation of this, Hales states, that the pulse of the horse, during the experiment, rose from 36 to 100 beats per minute, the blood at the time being projected with great energy.

If it were possible to apply the instrument of Poiseuille to a small and unimportant artery, without causing much pain to the animal, or keeping it in an unnatural position, the pressure would be very different from what is recorded. Barry, in his experiments to determine the influence of inspiration on the motion of venous blood, observed that the coloured fluid in the spiral glass tube employed, scarcely ascended at all towards the chest when the horse was standing, but was drawn with considerable force in this direction, when the animal was thrown on its back, and held in this constrained position. The same striking difference would be remarked in the experiments of Poiseuille, if performed under similar circumstances. What, then, is the value of the results furnished by the researches of this physiologist with respect to the propulsive powers of the heart? The extent of these powers, in the undisturbed conditions of the system, is still a problem, the solution of which awaits further and more successful inquirers.

The experiments will be admitted as presenting data for calculating the extreme force which the heart is capable of exerting, but throwing no light whatever on the degree of its influence in the ordinary conditions of the vital energies. Let not the two questions be confounded. The one, as we have already remarked, is comparatively simple, the other is complex and one of the difficulties of science, and will perhaps remain one of the mysteries of nature.

The experiments of Poiseuille furnish abundant evidence of the serious derangement produced in all the important functions of the system. In its unexcited state, the two acts of breathing, inspiration, and expiration, are so softly performed, that they can scarcely be regarded as affecting at all the motion of blood either in the arteries or veins; nor do they, in our opinion, to an extent worthy of appreciation. In the 11th experiment, made upon the horse, at one moment, *a*, the column of mercury was not at all affected by inspiration; but in the corresponding expiration it rose to 180 millim.; at *b*, the column during inspiration rose to 85 millim.; but in the corresponding expiration, it was 95 millim.; at *c*, it was 85 during inspiration, and 95 during expiration; at *d*, during inspiration, it was 60 millim., and during expiration, 120 millim.; at *e*, it was 35 during inspiration; and 145 millim. in the subsequent expiration; at *f*, during inspiration, it was 5 millim.; and during the following expiration, 175 millim.; at *g*, the column of mercury was not at all affected by inspiration, but in the subsequent expiration, it rose to 180 millim. Such, then, are the irregularities in the function of respiration, produced by the experimental researches of the physiologist, and consequently to the same extent in the circulatory powers, the force of which, in the undisturbed conditions of the system, it is the object of these experiments to determine.

But if the column of mercury were equally affected by the two acts, inspiration and expiration, this would be no evidence of the natural state of respiration. When the breathing is very much quickened by the pain or suffering of an animal, the two acts are usually equally excited, so that the irregularities in the pressure ndicated by the instrument may be much less than in the instances just pointed out, and yet the circulation may be disordered to the greatest possible degree. Poiseuille, from observing the difference in the height of the column, during inspiration and expiration, states, that the force with which the blood is moved in the arteries is diminished during the former act, and augmented during the latter.

This will be admitted to be the case in his experiments, and whenever the respiration is excited; but we doubt the fact in the ordinary and undisturbed states of breathing. The evidence adduced by Haller, Lamure, Lorry, Magendie, Barry, and Poiseuille, clearly establishes the influence of expiration on the current of arterial blood, but only when its action is extreme, and the circulation otherwise unfavourably circumstanced for the due performance of its function. The effect of an ordinary expiration on the course of the arterial fluid is in no degree elucidated by the labours of these distinguished physiologists. "We infer that the influence of the motions of respiration upon the circulation of the blood is increased in the large as well as in the small arteries when violent respiratory efforts succeed ordinary efforts. But this influence, particularly in the large arteries, is such, that, in inspirations, the force which moves the blood is very nearly equivalent to nothing, if it be not really nothing; and in compensation in corresponding expirations, this force becomes almost twice as great as in the natural state." The circulation is not thus circumstanced in the ordinary conditions of the system. In the experiments of Poiseuille, the arteries are full to distension, and in those in which the hæmadynamometer is fixed, the blood, as previously remarked, has no means of escape, and, consequently, the influence of the heart and that of respiration, will be represented by the instrument in its most aggravated form.

The effect produced upon it by either power is no indication whatever of the manner in which it is affected in a natural state of things, nor can any just inference be drawn from such an experiment of the motion of the arterial blood during either act of respiration. We do not believe that it is either accelerated or retarded by expiration or inspiration in the unexcited condition of the vital powers. Expiration, when violent, affects the contents of the arteries, simply from the contraction of the abdominal and thoracic parietes. In inspiration, the fluid may at times appear to be at rest, merely from the suspension of such contraction, and not from any suction power which it is capable of exerting. Poiseuille remarks that the influence of inspiration and expiration is the same on arteries differently situated with respect to the heart, when these acts are in their ordinary condition.

The instrument will unquestionably furnish such results, and such ought to have been anticipated. The only difference in the column of arterial blood near to and remote from the heart, in the experiments of Poiseuille, is a difference in its length, which will not materially modify the influence of expiration. If this physiologist had only considered that the blood, extending from the instrument to the heart, is confined between these two points, and that the vessel in which it moves, as well as the whole of the arterial system, is in a state of distension, he would have calculated on the instrument furnishing similar results, in the circumstances stated.

The striking difference in the condition of the circulation in the experiments of Hales and Poiseuille, and its undisturbed state, cannot be too strongly impressed upon the mind. The clear conception of it will exhibit difficulties inherent in such an inquiry, —difficulties, which, in all probability, no ingenuity will ever be able to overcome. To torture an animal, and at the same time to obstruct the course of the blood in a principal artery, is to produce the greatest possible derangement in the action of the heart, in the performance of respiration, and, as a necessary consequence, throughout the whole of the circulating system.

The arteries, the capillaries, and the veins are equally implicated in the existing disorder. If the physiologist imagines that this is not the case, he has not deeply studied the phenomena of circulation. These three classes of vessels are not to be regarded as inorganic tubes, always possessing the same quantity of blood, and thus having certain relations to each other which will always be maintained whatever be the state of the vital powers. In the natural condition of the system, the contents of these vessels are constantly varying. At one time, the arteries contain an exceedingly small quantity of blood, as is obvious from the scarcely perceptible pulse, at another, they are full to distension, and the fluid is urged forward with great force.

The condition of the capillaries and veins must necessarily be modified contemporaneously to the same extent, and the modifications, it must be remembered, coexist with corresponding changes in the action of the vessels, and in the other powers instrumental in the motion of the blood. No sagacity can estimate these changes, and as they are inevitably produced by all experiments which torture or mutilate an animal, the results which they evolve do not in any degree elucidate the ordinary functions of any class of vessels, or of any of the powers engaged in the circulation. These remarks apply as forcibly to experiments instituted to determine the action of the capillaries or the veins, as that of the arteries; and, in a subsequent part of this inquiry, it will be shown, that physiologists, in not being fully acquainted with the serious changes which their own experimental researches induced in the vital powers, have drawn erroneous conclusions from the phenomena on which they meditated.

When the contractions of the heart become weak, the column of venous blood augments,—a circumstance exceedingly unfavourable to the views of those who contend for the direct and all-important influence of this organ on the contents of the veins. It is admitted by Magendie, that, in this state of the animal system, he failed to arrest the current in the punctured vein, or intercepting the impulse of the heart in the corresponding artery. This fact is altogether irreconcilable on his doctrine, that the motion of venous blood depends entirely or principally on the impulse of the heart.

If this were its source of motion, why did it continue to escape when manifestly withdrawn from the influence of the impelling power? The changes in the distribution of the blood, under peculiar circumstances, may be regarded as a wise provision in nature, securing the vital powers from serious, and perhaps, fatal accidents,—a provision which could not possibly have suggested itself to the mind, on the supposition that the heart was the sole or principal cause of circulation. The mass of blood to be moved diminishes with the enfeebled contractions of the heart; and, were not this the case, death would frequently be the inevitable result. In illustration of this truth, we may advert to the modifications occurring in its distribution in syncope, during which the heart ceases, or nearly so, to contract. At this time there is a gradual diminution of blood in the arterial system, and a proportionate augmentation in the venous. On the revival of the powers of life, the contractions of the heart are extremely slow and feeble; but the small quantities of blood propelled meet with no obstacles in their course towards the capillaries. Can these contractions be imagined capable of communicating an impulse to the mass of blood accumulated in the veins? They are certainly inadequate to the production of this effect. When the impulse of the heart was interrupted in the experiments of Magendie, by compressing the crural artery, the blood beyond the point of compression continued its course through the capillaries and veins, leaving the artery ultimately empty. If such accumulation takes place in the venous system during syncope, and the fact is undoubted, the reviving contractions of the heart will clearly be incapable of propelling the columns of venous blood, which at this time are nearly at rest.

It has been proposed to measure the force of the heart by an experiment, which has been regarded as exceedingly simple, and which is often referred to by physiologists. It consists in crossing the legs, and placing upon one knee the ham of the other leg, with a weight of 55 pounds appended to the extremity of the foot. This considerable weight, though placed at the extremity of such a long lever, is raised at each contraction of the ventricle onaccount, it has been supposed, of the tendency to straighten the accidental curvature of the popliteal artery, produced when the legs are crossed in this manner. A writer, who has displayed considerable acuteness and sound judgment in physiological pursuits, remarks with great truth on this experiment, " in supposing that the force of the heart moves the extremity of the toe, loaded with a hundred pounds, they have forgotten that the weight of a few pounds will stop the pulsation at the groin. If they had thought of the tying of an artery with a hair, or of the compression of it with the point of the finger, or of the delicacy of the valves and coats, would the force of the heart ever have been estimated at 18,0000 pounds," or indeed at 55 or 100 pounds?

The calculation of the force exerted by the heart in raising a weight upon the foot has been a favourite theme; and if we could admit that the power of the heart was equal to the effect, we should be forced, perhaps, to admit the extravagant conclusions which have been drawn from this experiment. But it is altogether a delusion. I shall first state the fact and the form of the argument.

When one leg is twisted over the other knee, and the foot is held suspended, a distinct pulsation is perceived in the toe, and the toe will pulsate and rise, although the foot be loaded with 100 pounds. Now here the whole power of the heart cannot be exerted, for its force is divided between the head, the arms, the legs, so that, at the most favourable calculation, it is a fifth part of the natural force of the heart which moves the leg. In the next place, the leg is here as a lever of the third kind; the moving power is the artery behind the knee-joint; it moves the weight upon the foot in proportion as its distance from the centre of motion in the knee-joint is less than the distance of the centre from the weight, how much, therefore, must the weight of 100 pounds be increased in its pressure upon the pulsating vessel? yet the vessel throws it up;—the heart distending the vessel, with but a fifth part of its power, throws up this accumulated weight;—truly, then, the force of the heart is beyond calculation. What must it be at the aorta? What can withstand it? This consideration alone should have led to the re-examination of the presumed data, the grounds of this reasoning.

First, then, we find that at most a few pounds will stop the pulsation of the crural artery at the groin. In the next place, we find that, if the knee be supported upon a small pad, placed betwixt the ham-strings, or if the knee be suspended by grasping the condyles of the femur, there will be no pulsatory motion of the foot, although the leg hangs at right angles with the thigh. Farther trials will show that the fleshy bellies of the muscles of the calf or ham must rest upon the knee to produce the effect contemplated. If the experiment be made with the arm, the same circumstances will be observed. When we rest the elbow on the table, and bend the fore-arm to a right angle with the arm, no pulsation will be seen; but if the flesh of the arm rest on the back of a chair, so as to compress the veins, and make the bellies of the biceps and triceps press against the support on which the arm is extended, then the hand and fingers will pulsate like the foot in the other instance. But if the arm be made to press in such a manner that the trunk of the artery is compressed, and not the bellies of the muscles, then there is no pulsation observable in the hand and fingers. It follows that we are wrong in supposing the motion of the foot is owing to the popliteal artery changing from the curved towards the straight line; or in supposing that it is the attempt of the current of blood to force itself against the compressed artery. It is not the popliteal or the brachial artery which throws up the limb; it is the pulsation of the smaller arteries within the fleshy substance of the limb that produces the motion."*

Though we have attempted to show that the force of the human heart cannot be deduced satisfactorily from the experiments of Poiseuille, we are ready to admit, that his procedure makes a nearer approach to the truth than that of any other inquirer in the same path of research.

His method is simple and philosophical, and though liable to the objections which have been pointed out, it is perhaps impossible to invent an instrument capable of obviating them, or, in other words, capable of determining the force of the heart, or of the powers engaged in the circulation, without seriously augmenting or annihilating their ordinary influence.

In conclusion we may briefly remark:—

1. That the prevailing defect in the experimental researches of physiologists concerning the powers which move the blood, is the perfect indifference with which they have regarded the natural conditions of these powers and their important relations to each other. In their experiments to ascertain the force of the heart, the influence of the arteries or the effect of respiration, they appear insensible of the amount of derangement produced by their direct interference, in the character and relation of the objects investigated. In no instance is the amount of this derangement examined, or even alluded to as worthy of consideration. The same inattention will be obvious in the analysis of experiments instituted to determine the functions of the capillaries and veins, which will next be brought under view.

2. In the preceding pages we have dwelt at considerable length on the celebrated experiment of Magendie. The high authority in physiological pursuits, and the universally admitted conclusiveness of the experiment, gave it a just claim on our especial attention. If the strictures be well-founded, an appeal to it will no longer be made as a forcible illustration of the dependence of ve-

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* Sir Charles Bell.

nous circulation on the direct action of the heart. If it prove any thing, it establishes the influence of the capillaries on the motion of venous blood. It is also shown that syncope, which is adduced as evidence of this direct action of the heart on the contents of the veins, is accompanied by changes in the condition of the arteries, the capillaries, and the veins, the same as in the experiments of Magendie, and consequently does not in any degree elucidate the subject.

These changes are stated to be imperatively necessary to preserve life under such circumstances. On some future occasion we shall return to the consideration of this interesting fact, which is fraught with many valuable suggestions and much useful information of a highly practical character.

3. The experiments of Poiseuille, bearing on this inquiry, have been fully analyzed, and are shown to furnish no precise results with respect to the force of the human heart in the ordinary conditions of the animal system. The instrument, however, is better calculated to afford this information, than any of the various methods which have been employed by previous inquirers.

It is indeed more peculiarly adapted to throw light on this matter, than on any of the various objects of investigation to which it is applied by the ingenious inventor. As already remarked, its striking fitness to measure the force of the heart renders it altogether inapplicable to determine the force with which the blood moves in any part of the circulating system.

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## Art. IV.—*Analytical Account of the Researches and Rectifications in the practice of Auscultation and Percussion, made by* Dr Joseph Skoda, Teacher of Clinical Medicine in the Hospital of Vienna. By William Drysdale, M. D. and John R. Russell, M. D.

[Of the work of Dr Skoda, and of the nature of his researches, a short sketch will be found in the second department of this Journal. Our limits do not allow us there to introduce so fully as they deserve, the researches of the author, and the rectifications which these researches have led him to propose. But we have great pleasure in inserting here the following account by two learned young friends, who have spent a considerable time in Vienna, and who attended the lectures, and enjoyed the benefit of the personal instructions and observations of Dr Skoda. This account is the more valuable, that it was prepared upon the spot, and almost under the eye of Dr Skoda, and was from time to time read to him as it was prepared, and therefore is most likely to contain a correct and faithful account of his views, which, it will be observed, are not less remarkable for their originality, than for the number and importance of the rectifications which the author introduces.]—Editor.

### I. *Auscultation.*

The auscultatory phenomena of the respiratory organs may be divided into those of the voice, the sounds of respiration, and those produced by the rubbing of the pleura.

On examining the chest of healthy persons, it will be found that the sound of the voice is heard to a certain degree, amounting to strong resonance in some parts of the chest, while in others it is either not heard at all, or merely as an indistinct humming or buzzing sound. The strength of the sound thus heard in healthy persons is greatest between the shoulder-blades and the spine, weaker under the clavicles, and still weaker in the axilla, and over the rest of the chest; but it varies very much in intensity in different individuals. In disease it is so much modified, both in intensity and in the parts of the chest where it is heard, that many important indications may be derived from the varieties which it assumes.

Before considering the different kinds of resonance in detail, it is necessary to give an explanation of the mode in which the sound of the voice is transmitted through the chest.

As the voice is produced in the larynx, it must in all cases, whether weakly or strongly heard, be transmitted thence; and it would at first sight appear that the strong resonance is produced by a good, and the weak by a bad conducting power of the parts lying between the larynx and the parietes of the chest. Accordingly, it was long almost universally held by stethoscopical observers, that the increased resonance which accompanies a hard compressed state of the parenchyma of the lungs, or the presence of fluid in the pleura, depends on the increased conducting power of the intermediate substance. Several pathological facts, however, tend to throw doubt on the correctness of this explanation.

For example, if the chest be examined by repeated auscultation at successive intervals in the course of pneumonia, when there is hepatization of the lung, resonance of the voice, at one time very strong, at another only weak, will be perceived, while the other signs, particularly percussion, show that no change has taken place in the degree of hepatization. The cause of the occasional disappearance of the resonance of the voice is the obstruction by fluid matter of the bronchial tubes of the hepatized portion of the lung; for the resonance reappears readily when the patient makes a deep inspiration or coughs. This disappearance and return of the resonance, while in other essential particulars the hepatization remains the same, does not accord with the commonly assigned cause; for, according to it, it would be a matter of indifference whether the bronchial tubes contained air or not. In pleuritic effusion into the cavity of the chest, the intensity of the resonance of the voice diminishes as the quantity of the exudation increases; while the contrary should happen if the increased distinctness of the voice at any stage of the effusion depended on the superior conducting power of the interposed fluid. These contradictions to the commonly received explanation demand more minute examination of the grounds, on which it has been adopted.

The question of the superiority in conducting power of dense over rare bodies, has been too much regarded as an abstract law, without paying sufficient attention to the particular circumstances which may modify or prevent its operation. It is quite true that dense bodies conduct the sound more readily than rare ones, but only if the sound be confined to the medium in which it is formed, for it passes with difficulty from one medium to another. For example, the slightest scratching at the end of a long pole is heard distinctly when the other end is placed in contact with the ear, while, if this be not done, (*i. e.* if the sound be transmitted by the air,) nothing at all is heard. The striking together of two stones under water, when the head is immersed, is distinctly heard, while no sound is audible when it is taken out. On the other hand, the human voice which is formed in the air, is heard furthest in that medium. When the head is dipped into water, sounds produced in the air are heard very faintly or not at all; and solid substances, as a board or a wall, interrupt sounds more or less completely. The laws of physics teach us further, that sound is more or less reflected in its transmission from a rare medium to a denser one, and that the new medium takes up less than would have been propagated in the same space had it remained in the medium by which it had been till then transmitted; and the less sound is taken up by the new medium, the greater the difference of consistence and coherence between the two media. The reason why enclosed passages and tubes whose walls are of solid materials conduct sounds better than the open air is, because they reflect the vibrations which are thus confined to a small space, and prevented from being dispersed and lost in the surrounding air. If the walls of the tube were instrumental in conducting the sound, it is singular that a hollow tube should be used as a stethoscope, and not a solid cylinder of wood or metal. The voice, therefore, reaches the parenchyma of the lungs, not through the solid parts, but through the air in the trachea and bronchia, and ought to be carried further in the healthy lung, in which the air penetrates into the air-cells, than in the hepatized lung, where the air-cells and smaller bronchia are obliterated. The vibrations, likewise, should pass more easily from the ear into the light tissue of the healthy lung, than to the condensed parenchyma of the hepatized one, according to the law explained above.

A consideration of these facts would be almost sufficient in themselves to prevent us from acquiescing in the ordinary opinion, that the reason of the voice being louder when the lung is hepatized, than when it is sound and spongy, depends upon its being better conducted by the tissue of the lung when dense than when in its natural condition. Moreover, Dr Skoda has set this matter at rest by the following simple experiment, which he usually performs in the presence of his class, and which any one may easily repeat.

If the ear be applied to a stethoscope placed successively on corresponding parts of a sound and then of a hepatized lung removed from the body, the voice of another person who speaks through a stethoscope placed upon the lung at an equal distance in both cases, will be heard somewhat more distinctly in the sound than in the hepatized lung: but the distinction is so insignificant that, were the reverse the case, it would not account for the very marked difference in such a condition of the lungs in the living subject.

Dr Skoda explains the different degrees of strength of the voice in the chest by the law of consonance.

The fact that a sound can be heard, observes Dr Skoda, as distinctly at a distance as at the place where it is produced can only be explained, either by its diffusion being prevented, and its being obliged to remain concentrated during its progress, or by its being reproduced in its course by means of consonance and thus increased. But if a sound be heard louder at a distance than at the place where it was originally formed, this must be by means of consonance alone.

Consonance is a term adopted by Dr Skoda to express a well known phenomenon; and it may be here properly explained.

A tense guitar string sounds in unison with a note produced in its vicinity, either by another musical instrument or by the voice. A tuning fork held in the air emits a much weaker sound than when placed upon a table or chest. The table or chest must increase the intensity of the sound, by assuming the same vibrations as the tuning fork, or, in other words, by consonating with it. The note of a Jew's harp is scarcely perceptible when it is struck in the air, and it is heard much more distinctly when played in the mouth. Thus the air in the mouth must increase the sound of the Jew's harp, *i. e.* must consonate with it.

It sometimes happens that the voice is heard more strongly at the thorax than at the larynx, which in itself is sufficient to show that its strength is increased by means of consonance within the chest. The different degrees of the intensity of the voice heard at the thorax, may be explained by the different strength of the consonance within the chest. To ascertain these changes we must discover what it is within the chest that consonates with the voice, and by what circumstances the consonance is liable to be altered.

The voice as it issues from the mouth is composed of the sound formed at the larynx and the consonating sounds produced in the pharynx, mouth, and nasal cavities. This is shown by the alteration the voice undergoes by the shutting and opening of the nostrils and mouth, while there is no change made in the larynx. The pitch of the voice is evidently fixed by the larynx alone, and the opening and shutting of the nostrils and mouth has no influence upon it; the articulation of the voice, however, and its timbre depend upon the mouth and nostrils.

As it is certain that the air in the pharynx, mouth, and nostrils consonates with the sound formed in the larynx, there can be no doubt that the air in the trachea and bronchiæ may also be thrown into consonant fibrations with the sounds formed at the larynx. Hence it is the air in the chest and not the parenchyma of the lungs which consonates with the voice at the larynx, as the latter seems ill adapted for consonating, being neither stiff nor sufficiently tense. Those substances, such as air, tense strings, membranes, slips of wood, and thin plates, in which a musical sound is most readily produced, are most easily thrown into consonant of vibrations.

Air can consonate only when confined within a circumscribed space. In the open air the human voice and every other sound is heard more feebly than in a room. The air confined within the box of a guitar, violin, piano, &c. consonates with the note struck on the strings, while the sound is not increased by the consonance of the external air. The strength of the consonance depends upon the size and form of the space in which the air is confined, and upon the properties of the walls which bound the space. It appears that the consonating sound of the inclosed air will be the stronger, the more perfectly the walls reflect the sounds which spread through the air. A space surrounded by solid walls produces the greatest consonance, while in a linen tent the sound is but little increased. The cause of the strengthening of sounds by the speaking-trumpet is well known.

The air inclosed in a defined space does not consonate with every sound; and should it consonate with several different notes or sounds it does not reproduce them all with the same degree of strength and clearness. No body can sound in consonance with another, unless it is itself capable of producing the same note, or one whose vibrations form an aliquot part of the note. (Baumgaertner's Physik 4 Ausgabe Bd. I. p. 276.)

The deductions drawn from the physical principles just referred to may be used in explaining the consonance of the voice in the chest. The air in the trachea and bronchia can consonate with the voice in as far as their walls resemble the walls of the larynx, mouth, and nasal cavities, in their power of reflecting sound. In the trachea, the walls of which consist of cartilage, the voice consonates almost as strongly as it sounds in the larynx. In the two branches also into which the trachea divides the consonance must be nearly as perfect. On the entrance of the bronchia into the parenchyma of the lung they have no longer cartilaginous rings, but merely thin irregular plates of cartilage interspersed in the fibrous tissue. As the bronchia ramify, these plates become smaller, thinner, and less numerous, and at last disappear altogether, and the finest twigs of the bronchia consist merely of membranous canals. In the normal state of the parenchyma of the lung the air in the bronchia consonates less strongly with the voice than that in the trachea, in proportion to the smaller number of cartilages they contain. The conditions which increase the consonance of the voice in the air contained within the branches of the bronchia that ramify in the parenchyma of the lung are either that the walls of the bronchia have become cartilaginous or, if still membranous, very thick, or that the surrounding tissue of the lungs has become devoid of air;—in all these conditions the walls reflect the sound more strongly than the membranous walls of the normal bronchia;—and there must be no interruption of continuity between the air in the bronchia and that in the larynx. If the air in a confined space be thrown into either original or imported autophonous vibrations, which give rise to sound, the surrounding walls not unfrequently partake of the same vibrations, and they do this the more readily the less stiff and hard they are.

The organ pipe vibrates when the air contained in it sounds. The same is true of the speaking-trumpet. The larynx vibrates with every sound produced in it, and its vibrations are perceptible through several inches of animal substance. The walls of the bronchiæ which ramify within the parenchyma of the lungs will, if the air within them consonate with the voice, be thrown into vibrations as readily as the larynx, and these vibrations may spread through a layer of fluid or muscle several inches thick even to the parietes of the thorax, and the sounds produced by consonance in the bronchiæ will be perceptible at the walls of the chest.

In order to illustrate the above explanation of the difference of resonance of the voice in the chest, Dr Skoda performed a considerable number of experiments, a few of which are the following.

As after death the bronchia are almost constantly found filled with fluid, the lungs themselves are rendered unfit for the purpose of experimenting, we must therefore choose other tissues whose powers of reflecting sound resemble severally that of the healthy and hepatized lung.

In this respect a portion of the small intestine represents pretty well the more membranous parts of the bronchia, and a portion of the heart and liver the hepatized lung. If a person speak through a stethoscope placed on one end of a moderately inflated small intestine, consonant vibrations of the voice, in the air within the intestine may be heard by another person listening through a stethoscope placed on the other end of the intestine. If a layer of solid or fluid substance be interposed between the mouth of the stethoscope and the intestine, as, for example, a piece of liver or of intestine filled with water, the sound is heard very indistinctly, and not at all if the thickness of the interposed substance reaches half an inch.

If a passage be bored in the liver, so as not completely to pierce it through, and this be spoken into by means of a stethoscope accurately fitted into the entrance of it, the voice may be heard along the whole length of the passage, and for a considerable distance on each side, through a stethoscope placed over it, so strong, that it by far exceeds in intensity the voice proceeding from the mouth of the speaker, which is heard by the free air. The voice can still be heard even when a layer of liver, lung, cartilage, or bone several inches in thickness, be interposed, although naturally weaker and weaker as the thickness of the interposed substance is increased. If the liver be plunged in water, it is still heard through a stratum of water two inches thick. Similar experiments may be performed with the heart and with the larynx and bronchi. If a piece of intestine, prepared as in the first experiment, be plunged under water, observing the precaution that no water gets into the stethoscope, the voice is heard much louder than if the experiment be made out of the water.

These experiments show tolerably distinctly what relation the voice in the thorax holds to the different conditions of the lung. If the voice in the intestine, when not immersed in water, consonate so feebly as to be inaudible through a layer of lung, liver, or fluid half an inch thick, the consonance in the membranous bronchia will likewise be so slight as not to be heard at the walls of the chest. But, on the other hand, as the voice in the heart and trachea, and in the passage bored in the liver, consonated so strongly, as to be heard through an interposed substance several inches thick, so will the voice in the bronchia of a lung hepatized or infiltrated with tuberculous matter, consonate so powerfully as to be heard louder upon auscultation at the thorax, than as it issues from the mouth.

The consonating voice within the chest differs very much in clearness, loudness, and timbre or quality from the voice proceeding from the mouth, and varies in itself at different times; but as the cause of these differences is not well understood, and as they do not afford any diagnostic signs, it is unnecessary to enter more minutely into them here.

## II. *Morbid States of the Respiratory Organs which can give rise to an increased Resonance of the Voice.*

1*st*, *All morbid processes, by which the lungs can become void of air, dense, and solid through infiltration of foreign matters.*—The walls of a bronchial tube surrounded with parenchyma, in this condition, must reflect the sound as well or better than the larynx. The strength of the consonance will be the greater the denser the parenchyma. The diseased processes which bring about this change are, hepatization, infiltration of the parenchyma, with tuberculous matter and hemorrhagic infarction, or the pulmonary apoplexy of Laennec. In all these morbid states, before the increased resonance of the voice can take place, all the air must be completely expelled from the air-cells, and the condensed portion of lung must be of sufficient size to contain, at least, one of the larger bronchial branches, which must contain air, and be in communication with the larynx. The more extensive the hepatization is, the more distinctly will the increased resonance be heard over the hepatized part. Accordingly, it is heard most frequently in extensive hepatization, infiltration, with tubercular matter, and the induration remaining after hepatization. Incipient pneumonia, lobular hepatization, (inflammmation confined to individual lobules.) Œdema of the lungs cause either no resonance or only a trifling degree of it. Solitary tubercles, however numerous, cause no resonance, so long as the intermediate tissue contains air. As Laennec's apoplexy of the lungs is a disease only of rare occurrence, it is seldom observed as a cause of increased resonance, especially as it is, in general, confined to a small extent of the lung.

2. *The diseased states through which the lung becomes devoid of air in consequence of compression.*—In this state, the lung never reaches the same degree of solidity as in pneumonia or tuberculous infiltration, and, therefore, the resonance is never so considerable as in the latter affections. To admit of resonance being produced by compression of the lung, the compressed portion must contain a bronchial tube, sufficiently strong, from the number of its cartilages, to prevent the obliteration which happens to the merely membranous bronchiæ. Of all the numerous causes of compression of the lung, such as effusions in the pleura; tumours in the chest or abdomen; aneurism and effusion in the pericardium; curvature of the spine, &c. by far the most frequent, indeed almost exclusive, one of increased resonance of the voice, is the presence of fluid or air in the cavity of the pleura.

The quantity of fluid necessary to produce resonance varies very much in different cases,—in some half a pound being sufficient, while in others several pounds are required.

*Varieties of the voice heard in the Thorax.*—In the healthy state, in all parts of the chest, except those immediately to be mentioned, there is heard no proper resonance of the voice, but merely an indistinct buzzing sound; but in the space between the scapulæ, the voice may in many persons be heard with different degrees of distinctness, and sometimes so strong that a moderate concussion of the ear may be felt. The same may likewise sometimes be perceived in the spaces below the clavicles, though in a less considerable degree. This resonance of the voice never reaches that degree of clearness and strength which may present itself at any part of the chest affected with hepatization or tuberculous infiltration.

The varieties in the morbid state are:

1. Strong bronchophony, *i. e.* that resonance of the voice attended with simultaneous concussion of the ear, or, as Laennec describes it, which penetrates completely through the stethoscope.
2. Weak bronchophony, the voice without, or with imperceptible concussion of the ear, or which does not penetrate completely through the stethoscope.
3. The indistinct buzzing, with absence of all proper resonance.
4. The amphoric and metallic echoes.

*The Strong Bronchophony.*—The voice is heard as strong, or even stronger, or somewhat weaker than in the larynx. Its appearance at any part of the chest indicates with certainty the existence under the spot of a solid, condensed portion of lung of considerable extent, which may either be in contact with the walls of the chest, or separated from them by a layer of solid or fluid exudation in the pleura of moderate thickness. The presence of fluid in the pleura can never of itself give rise to the strong bronchophony.

The diseased states, whose existence may be suspected from the presence of strong bronchophony, are,—Pneumonia or pleuropneumonia, in an advanced stage, *i. e.* hepatization, without any or with a moderate amount of pleuritic exudation; tuberculous infiltration of the parenchyma; hemorrhagic infarctus of considerable extent; thickening of the walls of the bronchia, with complete disappearance of the proper substance of the lung; carnification of the lung, or a very high degree of œdema of the lung, along with pleuritic effusion, by which the air has been completely pressed out of the tissue of the lung. Of these, however, the hepatization and tuberculous infiltration are so much more frequently indicated, that the others may in practice be almost left out of view, as they are not only very rare, but also seldom reach such a height as to produce strong bronchophony.

Laennec thought that the resonance from cavities was of a peculiar kind, different from bronchophony. He named it pectoriloquy, and conceived it to be pathognomonic of excavation in the lungs. On close examination, however, it will be found, that of the characteristic signs of pectoriloquy given by Laennec, only one refers to the voice itself, viz. that in pectoriloquy the voice penetrates the stethoscope completely, while in bronchophony it merely enters it; and all the others are only collateral circumstances, such as the circumscribed or diffused extent of the sound, its timbre, the general symptoms, &c. But, as in many conditions of the lung just described, the voice penetrates the stethoscope completely, the distinction proposed by Laennec falls to the ground; and pectoriloquy must be considered as nothing but strong bronchophony, and, therefore, cannot be received as alone sufficient to indicate with certainty the presence of a cavity. As a cavity in a hepatized lung is very rare, while in a tuberculous one it is very frequent, we shall, in the latter disease, when strong bronchophony is heard, seldom err in diagnosticating a cavern at the place where it it strongest; but here our diagnosis does not rest on the character of the voice alone, but is aided by the other stethoscopic signs, and the general symptoms and course of the disease.

*Weak Bronchophony.*—To constitute weak bronchophony, the voice must be clearly and distinctly heard, but unaccompanied by little or no concussion of the ear. It may attend any of those diseases above enumerated as giving rise to strong bronchophony, and in addition pleuritic effusion of considerable extent and hydrothorax. Its presence alone is insufficient to determine the existence of fluid in the pleura, but recourse must always be had to percussion, auscultation of the respiration, position of the neighbouring organs in making the diagnosis.

*Egophony.*—A peculiar modification of the resonance of the voice has attracted the attention of stethoscopists, and there has been much discussion (on which our limits do not permit us to enter) to determine its cause and value as a diagnostic sign. It was conceived by Laennec to indicate the presence of a thin layer of fluid between the lung and the walls of the thorax; but later observations have established the fact, that it has been heard in cases of pneumonia and tuberculous infiltration, where there was no fluid at all in the pleura, also in cases where there was a very large collection of fluid in the pleura, and that it has been absent in cases of effusion of various amount; and finally, in some cases of effusion into the chest, as well as in pneumonia, without any fluid being contained in the pleura, individual words or even syllables partake of the trembling or egophonic character, while others are destitute of it. Egophony may be, therefore, regarded as a mere modification of bronchophony, which has no essential connection with the existence of fluid in the chest, and has otherwise no particular importance.

The strong as well as the weak bronchophony passes imperceptibly into the indistinct murmur, and there is no defined boundary between these two sounds. It is easy, indeed, to distinguish between the extremes; but the transition sounds it is extremely difficult to distinguish. No conclusion should be drawn from the resonance of the voice, unless it possess the unquestionable character of bronchophony.

*3d. Indistinct Buzzing Sounds.*—This resonance of the voice affords no definite indication. It does not indicate that the organs are in a state of health, for, as many conditions are required to produce bronchophony, the absence of any one may prevent its appearance, *e. g.* the bronchial tubes may not be open but obstructed with mucus, so that the consonance cannot take place, while, at the same time, any one of the morbid conditions just mentioned may be present.

### III.—*Auscultation of the Respiration.*

The passage of the air through the respiratory tubes causes in the healthy state certain sounds which are variously modified by disease.

The sounds produced by the respiration in the larynx, trachea, and larger bronchia are of a rushing character, most closely imitated by, (as in the pronunciation of the consonant *ch*, German or Greek χ,) that is, by impelling the air against the hard palate. During gasping it is produced involuntarily. The pitch may differ according to the width of the opening admitting the air, and is generally higher in the larynx than in the lungs; but the character just mentioned remains always constant.

The respiratory murmur in the air-cells and smaller bronchia resembles very nearly the sound produced by drawing in the breath with the lips nearly closed, or pronouncing the consonants *v* or *b*, while inspiring, or, as it were, sipping the air. It is only heard during inspiration; and during expiration, there is heard in the air-cells and smaller bronchia either no sound at all or a very slight blowing noise between the sound of *f* and *h*, pronounced in expiration. The respiratory murmur in the air-cells is heard most strongly and distinctly in children.

*Varieties of Respiratory Sounds.*—(Skoda.)—1. Vesicular Respiration; 2. Bronchial Respiration; 3. Indeterminate Respiratory Sounds; 4. Amphoric and Metallic Respiration.

The name vesicular respiration can only be applied to that respiratory murmur which resembles sipping air as above described. No other sound which does not display this character distinctly can merit the appellation, even although occurring in healthy individuals. Such a sound can be produced in no other way than by the penetration of the air into the air-cells. The sound during expiration has no connection with vesicular respiration, for it may be entirely wanting, or may be strong or weak, without in the least influencing our judgment as to the presence or absence of the vesicular murmur. The cause of the vesicular murmur is the friction of the air against the walls of the air-cells and fine bronchial tubes, which, by their contractility, oppose a certain degree of resistance to its entrance. From this may also be explained the great disproportion between the strength of the respiratory murmur in the pulmonary cells during inspiration and during expiration, for in the latter the air encounters no resistance. The case, however, is different in the larger bronchia, and more especially in the larynx and trachea, for the air has no resistance to overcome in its passage through these during inspiration; on the contrary, it is rather drawn in by the rarefaction of that within the chest, while in expiration it passes from a larger space,—the air-cells into a smaller one, the bronchia, trachea, and larynx, and is consequently compressed; therefore, the expiration is usually louder in those parts than the inspiration. The presence of the vesicular respiration in any part of the lung is incompatible in it with any of those diseased states which prevent the penetration of the air into the air-cells, viz. compression of the parenchyma by exudation; tumours in the chest; enlargement of the heart; infiltration of the parenchyma, with plastic (that is pneumonic) or tuberculous matter, or with blood, serum, &c. But it can coexist quite well with solitary tubercles, however numerous, and with inflammation confined to single small lobuli, *i. e.* lobular hepatization, and is frequently found along with these morbid changes.

The vesicular respiration may be increased to puerile respiration, which depends upon rapid and deep inspiration, and increased resistance of the cells, or it may be rough, from a change in the constitution of the lining membrane of the bronchia. The rough vesicular murmur indicates the least degree of swelling, and is always combined with increased loudness of sound. The vesicular respiration passes insensibly into the indeterminate respiration, and the rough into the rattles.

The vesicular respiration may occur without any sound in expiration, or such a sound may be present in various degrees of intensity. Sometimes the expiration is much louder than the inspiration. When a sound is present in expiration, it always indicates that there is present in the bronchia some obstacle to the discharge of the air, and this generally consists in a swelling of their lining membrane.

*Bronchial respiration.*—To admit of a sound being recognized as bronchial respiration, it must have the same character as laryngeal or tracheal respiration, and can only differ from these in its pitch. It is imitated by blowing through a tube, or with the tongue and mouth, as in the position necessary for pronouncing the consonant *ch* in inspiration or expiration, as before explained.

The bronchial respiration indicates precisely the same states as the weak bronchophony, and these need not be again enumerated. But it never occurs in the normal condition of the respiratory organs, and, therefore, it always indicates a morbid state, even when occurring in the space between the shoulder-blades, except in the neighbourhood of the first dorsal vertebra, where it is heard in rare cases in healthy subjects, in dyspnœa, or deep inspiration.

The production of the bronchial respiration, like bronchophony, has been attributed by Laennec, Andral, and others, to the increased conducting power of the condensed lung, (which renders the rushing noise of the air streaming in and out of the bronchiæ more audible.) But, in addition to the foregoing arguments, opposed to better conduction of the voice, depending on the condensed state of the lung, the following is conclusive against this opinion. As the bronchia are merely passages for conducting the air into and out of the air-cells, the more the latter are capable of being expanded and contracted, the greater will be the streaming of the air through the air, bronchia, and *vice versa.* But in the healthy state, where the streaming of the air is greatest, there is no bronchial respiration at all; while, in a completely hepatized lung, where there can be no expansion or contraction of the tissue worth mentioning, and consequently, no streaming of air through the vesicles, the vesicular respiration is loudest. The true explanation is undoubtedly that of Dr Skoda, viz. that it is from the air in the bronchia vibrating in consonance with the respiratory sound of the larynx, trachea, and bronchi, the condition necessary for consonance being afforded by the condensed lung, as already explained under the head of bronchophony.

The bronchial respiration can be in pitch higher or lower, and in intensity weaker or stronger than the laryngeal respiration; differences which depend upon the part of the windpipe, with which the air in the bronchiæ consonates, for it does not always consonate with the larynx. These differences depend on other circumstances likewise which it is unnecessary to detail here.

The cavernous respiration of Laennec differs in no essential particular from bronchial respiration, and cannot be taken as a diagnostic sign of a cavity, unless accompanied by the amphoric or metallic echo.

The respiratory sound, named by Laennec *respiration soufflante*, and described by him as giving rise to the sensation, when listened to, as if air was drawn from the ear of the auscultator, during inspiration, and blown into it during the expiration of the patient, is merely a strong form of bronchial respiration; and its strength depends not only upon the greater or less distance of the bronchus or cavity in which it is formed, but also upon the rapidity and amount of motion in the lungs, and the more or less perfect consonance of the parts.

*Indeterminate Respiratory Sounds.*—Under this term are comprehended all those respiratory sounds which cannot be referred to any of the preceding forms of respiration, or to the rattles or friction of the pleura, to be afterwards described. The respiratory murmur in the air-cells is sometimes so ill-marked as to be indistinguishable from the respiratory sounds which spread from the deeper bronchiæ or larynx, and a weak rattle at a distance may resemble an indistinct respiratory murmur in the air-cells. As such a respiratory murmur may arise from many causes, it is impossible to say what is the cause in any given case—whether it be the entrance of the air into the air-cells; the stream of air into the larger bronchia, or a distinct rattle, or two or more of these combined. Neither the sound derived from the larger bronchia, when it is not bronchial respiration, nor the indistinct respiratory murmurs, afford grounds for forming any conclusion as to the condition of the parenchyma of the lungs. Such being the case, any subdivision of them is superfluous, and they may be all included under the name of indeterminate respiratory sounds. Although a very skilful ear may be able to detect the transition of the distinct forms of respiration into the indeterminate, yet, whenever a sound is at all doubtful, it is much better to class it among the indeterminate, and to call in the assistance of the other signs and indications in forming a diagnosis.

*The Rattles.*—The rattles are sounds produced in respiration by the breaking of the air through fluids, such as mucus, blood, &c. and sometimes by its passing over solid substances, such as a fold of mucous membrane, which, in consequence, may be thrown into vibration. Most of these resemble the bursting of bubbles; others are like the creaking of leather; crepitation of salt, &c.

They differ very much in the loudness and clearness with which they are heard; also in dryness and moistness, in frequency, size of the bubbles, &c.; but to describe all these circumstances would lead into too minute details for the present object.

*Division of the Rattles.*—1. The vesicular rattle; 2. the consonant rattle; 3. the crackling, or dry crepitating rattle with large bubbles, (râle crépitant sec à grosses bulles ou craquement of Laennec); 4. indeterminate rattles. 5. rattles with amphoric echo.

The vesicular rattle is that produced in the air-cells and small bronchial tubes. Its peculiar character is that the bubbles are very small and of equal size. It indicates the presence of fluid, such as mucus, blood, or serum, in the finest bronchial tubes, and air-cells; and also that the latter are penetrated by the air. Its presence, therefore, shows that none of the morbid conditions which prevent the entrance of the air into the air-cells can exist.

This sound corresponds to the moist crepitation of Laennec, which he considered as pathognomonic of incipient pneumonia. Its occurrence, however, in its pure form, is rare in pneumonia; and it is likewise heard in other morbid affections, such as œdema of the lungs, tuberculosis, and even common catarrh. With the view of obviating this difficulty, Laennec divided it into crepitating and subcrepitating; but, as numerous facts attested by Andral, Chomel, Cruveilhier, and Skoda, prove that this is not a sufficient distinction, the presence of the crepitating râttle can only be held to prove the existence from some cause or other of fluid in the air-cells, and their permeability by air; and we can only conclude that pneumonia is present, if we discover its other indications.

The consonant rattle is clear, high in pitch, and the bubbles which form it are unequal in size. Such a rattle is produced in the larger branches of the bronchia, and in the trachea; but when heard at the parietes of the chest, after having been transmitted through the lungs by conduction, it loses much of its height and clearness. If, however, the conditions for consonance are present, it is heard of an intensity and clearness equal to that at the place of its origin.

The consonant rattle is therefore diagnostic of the same state as bronchophony and bronchial respiration; but, as rattles seldom occur in exudation, it indicates in general pneumonia or tuberculous infiltration.

*Laennec's dry Crepitating Rattle.*—This sound, according to Laennec, resembles that made by the blowing up of a dry pig's bladder. It is held to be a pathognomonic sign of vesicular and interlobular emphysema; but it occurs only in those cases in which the cells are expanded to the size of a barleycorn or bean, and communicate with a bronchial tube. It occurs also when the bronchial tube is expanded into a sac, and in excavations of the lung, which do not communicate with the bronchia by too wide an opening, and have membranous walls. The cause of the appearance seems to be that the air-cells, from having lost their resilience, instead of contracting during expiration, merely collapse when the air leaves them; and, on the return of the air on inspiration, are suddenly expanded with a crackling noise.

It is doubtful, however, whether it be possible to distinguish this sound from that made by the presence of tough mucus in the air-cells and finer bronchial tubes.

*Indeterminate Rattles.*—Under this head are included all those rattles commonly called mucous râttles which are not vesicular or consonant, and are not accompanied by the amphoric echo. They afford no information as to the state of the parenchyma of the lungs, and therefore indicate merely the presence of fluid in the bronchial tubes.

*Amphoric Echo and Metallic Tinkling.*—In speaking into an empty earthern-ware vessel with a dilated body, there is heard, besides the voice, a peculiar humming sound; this represents the amphoric echo of Laennec. There is likewise heard in the vessel, but better in large spaces inclosed with solid walls, such as chambers, and especially vaults, frequently a metallic echo accompanying the voice if somewhat loud. This is the metallic echo or tinkling.

In a tube that is not very wide the amphoric echo is never produced.

In cases where there is a large cavity in the chest whose walls are disposed to reflect sound, and which contains air, a similar sound occurs. As the conditions for its occurrence are, that the cavity be large and contain air, it has only been met with in cases of extensive excavations of the parenchyma of the lung, and in pneumothorax. Laennec believed that a cavity must contain air and fluid to enable it to exhibit these appearances, and his opinion has been universally adopted. But the presence of fluid is quite superfluous, as both a jar and a chamber produce the sound without their containing any; and if an inflated stomach, in which there is no fluid, be spoken against by means of a stethoscope, the amphoric echo and metallic tinkling are heard within it.

Laennec believed further that the cavern in the lung or the cavity in the pleura must communicate with a bronchial tube to enable the sounds to occur. But only in the rarest cases of pneumothorax does a communication with the bronchia remain, while the amphoric and metallic sounds are an almost constant attendant of this morbid state. In the experiment with the stomach there was no communication with the external air, and this leads us to the true explanation, which seems to be, that the air contained in one of the bronchial tubes consonates with the voice, and produces vibrations within the cavity of the pleura or cavern in the lung, from which it must not be separated by more than a thin layer of parenchyma.

The mechanism of these sounds will be easily understood, if we keep in mind that they are merely the peculiar character given to the sounds of the voice and respiration already described, by their being re-echoed in a space of considerable size filled with air.

The amphoric respiration, or *bourdonnement amphorique,* arises either from the respiratory sound in a large bronchial tube which opens into a cavity, or the re-echoing in the pleura filled with air of the bronchial or consonating respiration in a neighbouring tube.

The metallic tinkling, *tintement metallique*, may arise from bronchophony, from rattles, or from the agitation of fluid produced by coughing, or violent motion, re-echoing in a cavern, or in the pleura when filled with air. Of these by much the most frequent cause are the rattles.

## Art. V.—*On the Action of certain Inorganic Compounds, when introduced directly into the Blood.* By James Blake, Esq., M. R. C. S. L., F. R. M. C. S. [Read before the Royal Society, January 21 and 28, 1841.]

In a paper on the actions of poison, which I presented to the Royal Society in April 1839, and which was read on the 13th of June in the same year, I incidentally alluded to some experiments I had performed on the action of salts, when injected into the veins. On that occasion I merely noticed these experiments, on account of their having enabled me to determine the time required by the blood, to pass from one part of the system to another.

The results of my experiments on the introduction of saline substances into the vascular system, were communicated to the "Academie des Sciences" at Paris in the same year. (This memoir was published in the "Archives Generales de Medecine," November 1839.) Since this period, a further investigation of the subject has afforded me many new facts, which I now propose to lay before the Society.

At the time I wrote my former memoirs, I had only investigated the actions of the substances I had experimented with, in relation to their action on the heart, and the changes to which they appeared to give rise in the lungs. I had, in fact, divided these substances into two classes, one of which included those which appeared to produce death by destroying the irritability of the heart, whilst the other contained those substances, which prove fatal by arresting the pulmonary circulation. Entirely occupied by these two phenomena, I had noticed but casually the action which the salts of soda and potash appeared to exert on the general capillary circulation. The experiments I have now to bring forward will prove, that the effects that these and some other substances produce on the general capillary circulation, form an important element in the investigation of their general action on the animal economy. But besides those phenomena which depend on the action of these salts on the vascular system, there are others to which I had not at all directed my attention, viz. the effect which these substances appear to give rise to, by their contact with the nervous and muscular tissues. In the present memoir I have carefully recorded the effects produced by each substance on the different tissues to which I have now alluded, at least where these effects have been of a nature to be readily appreciated. I have, in fact, endeavoured to investigate the properties of the living tissues, in the same manner as the chemist would investigate the nature of an inorganic compound, that is, by observing the phenomena it presents, when brought into relation with other substances.

I am aware that, in the present state of physiology, such a step may appear rash, and not likely to lead to any positive results; but I know of no surer means that we can command of becoming better acquainted with the complicated phenomena which constitute life, than by introducing certain definite modifications in the circumstances under which these phenomena occur; and I think there can be no question, that the direct introduction of inorganic substances into the blood, affords us one of the most certain means of producing definite and appreciable changes in these circumstances. It is, however, equally true, that the present imperfect state of chemistry leaves us completely in the dark as to the nature of the perturbations which are thus produced, depriving us at the outset of every hope of arriving at any general conclusions, and confining our researches to the mere observation of facts. It is these considerations that have induced me to lay before the Society the following memoir, although I am fully aware that the experiments I have performed, still leave many voids to be filled up. The vast extent of the subject, however, involving, as it does, some of the highest physiological problems, precludes the hope that I should ever have arrived at a point, at which I might consider these researches as complete.

Before proceeding to the detail of the experiments, I shall shortly describe the manner in which they have been performed. The phenomena connected with the vascular system have been observed by the aid of the hæmadynamometer,—an instrument invented by M. Poiseuille, for ascertaining the pressure that the blood exerts on the parietes of the vessels. Had it not been for the almost mathematical precision which this valuable instrument enables us to introduce in researches on the circulation, I certainly should never have ascertained many of the facts which I have now to bring forward. A description of this instrument will be found in Todd's Cyclopædia of Anatomy and Physiology, Art. "Circulation." In ascertaining the pressure of the blood in the arterial system, this instrument has always been connected with the femoral artery. When the substance experimented on has been injected into the veins, it is the external jugular that has always been selected for this operation; when into the arteries, the injecting tube has been introduced either into the right or left axillary artery, the point of the tube looking towards the heart, so that any fluid injected through it should be forced through the subclavian artery into the aorta, and thus become mixed with the blood circulating through the body. In all operations requiring the use of the hæmadynamometer, it is necessary that the animal should be confined, in order to command the requisite degree of steadiness. In these circumstances, it is impossible to observe with accuracy the general symptoms that are produced. I have, therefore, always devoted a distinct experiment for the purpose of ascertaining these symptoms, a tube being inserted into the jugular vein, and the animal being placed on the floor, and allowed full liberty, the moment after the substance to be experimented with had been introduced into the vein. In these circumstances, any general symptoms that were produced would be readily detected. The whole of these experiments have been performed on dogs; they have been chosen as nearly as possible of the same size and strength: the general weight was from 12 to 16 pounds. The substances I have used in these experiments have been the sulphate and nitrate of magnesia; sulphate of zinc; sulphate of copper; nitrate of lime, and chloride of calcium; chloride of strontium, and nitrate of strontia; chloride of barium, and nitrate of baryta; acetate of lead; nitrate and acetate of silver; chloride of sodium, and nitrate and sulphate of soda; nitrate and hydrochlorate of ammonia; nitrate, sulphate, biarseniate, and bicarbonate of potassa, and the alkali itself.

The order in which I propose stating the experiments I have performed with these substances, is that in which they are here arranged. This arrangement may be considered in some respects a natural one; for each class of salts, from magnesia to soda, will be found connected by its physiological action more closely with the salt that more immediately precedes and follows it, than with any other.

The fact which I stated in the memoir presented to the Academy of Sciences at Paris, (see Archives Generales de Med. Nov. 1839), that all the salts of the same base exert an analogous action when introduced directly into the blood, a fact, the correctness of which has been proved by a far more extended series of experiments, will dispense with my stating the action of more than one salt of each base.

*Magnesia.*—When a solution of a salt of this base is injected into the veins, its first effect, if it be not too strong, is to quicken the action of the heart; and it also exerts a powerful influence on the character of the pulse, as is shown by the change which takes place in the oscillations of the column of mercury, indicating the pressure in the arterial system. Six grains of sulphate of magnesia, dissolved in five drachms of water, when injected into the veins, caused the pulsations of the heart to become quicker ten seconds after the injection, or at the moment when the blood containing the salt was circulated over the heart; at the same time, the oscillations of mercury in the hæmadynamometer became much diminished. The pressure in the arterial system was, at the commencement of the experiment, equal to a column of mercury, varying from five to seven inches and a half, at each pulsation of the heart; but a few seconds after the injection, the column of mercury was nearly stationary at six inches, the oscillations not being more than two or three-tenths of an inch, instead of two inches and a half, as they were before the injection. Two minutes after the injection, the effects of the salt had quite gone off, the action of the heart being just the same as it was before the introduction of the salt. Five minutes after the former experiment, a solution containing sixteen grains of the salt was injected into the veins, and produced analogous effects on the heart in about ten seconds; thirty seconds after the injection, the pressure in the arterial system became lower, proving that some change had taken place either in the quantity of blood sent into the arteries, or in the facility with which it was discharged through the systematic capillaries; for it can only be by a modification of one or the other of these elements that any change can take place in the pressure in the arterial system. When injected in larger quantities, this salt suddenly arrests the action of the heart. A solution containing a drachm of the salt to six drachms of the water, arrested the action of the heart eight seconds after its introduction into the veins. The inspection of the thorax immediately after death, discovered the heart motionless, although exposed half a minute after respiration had ceased. On opening the pericardium, slight movements were observed on that part of the parietes of the ventricle corresponding to the interventricular septum. The auricles were quite motionless. The left cavities of the heart were filled with blood, of a bright scarlet colour; that in the right cavity was dark. The presence of arterialized blood in the left cavities of the heart, affords a certain proof that the movements of this organ had stopped, before respiration had become arrested.

When injected into the arteries, the sulphate of magnesia does not appear to have any influence on the passage of the blood through the general capillaries. A tube being introduced into the right axillary artery, a solution containing sixteen grains of the salt was injected into the artery. No immediate change was observed in the pressure in the arterial system, which could not have been the case, had any change taken place in the passage of the blood through the general capillaries. The immediate effect on the column of mercury in the hæmadynamometer cannot be carefully noted, owing to the violent cries and efforts of the animal, which produce great oscillations in the mercury; the pressure certainly was not augmented; and in about a minute, when the struggles of the animal had ceased, the column of mercury was found to have diminished about one inch. Five minutes after the above experiment, a second solution, containing thirty grains of the salt, was introduced into the artery. The phenomena that followed were analogous to those just described, except that the oscillations in the column of mercury were rendered less. When a much larger quantity of this salt is injected, death appears to follow, owing to its action on the nervous system ; as it appears not to arrive at the heart in a sufficiently concentrated state to arrest its pulsations.

The general symptoms that follow the introduction of this substance into the veins depend, as might be supposed, on the quantities used. A solution, containing eight grains of the salt, when injected into the veins, caused slight dyspnœa ten seconds after its introduction ; in twelve seconds, the animal fell down, as if suddenly paralysed, but soon rose again, and did not appear to suffer any inconvenience. Two minutes after the injection, vomiting took place. After a few minutes, a solution containing fourteen grains was injected ; the animal was evidently affected in ten seconds ; in twelve seconds, it fell on its side ; the legs extended, and appeared totally deprived of all power to move ; the muscles seemed even to have lost their tonicity, as the limbs remained in the position in which they were placed ; there were not the slightest spasms or convulsions, nor did the animal appear to suffer, although perfectly sensible. After lying in this state for ten minutes, the animal got up and walked, but very unsteadily. The action of the heart was arrested on introducing into the veins a solution containing thirty-five grains of the salt ; the heart became paralysed, and the animal fell about twelve seconds after the injection, stretched its legs, and was dead in about thirty seconds,—not more than two or three respiratory movements taking place after the action of the heart had ceased. On opening the thorax, the heart was found in the same state as in the case above related, where this salt was injected into the veins. The presence of this salt in the blood did not interfere with its coagulation. The lungs were rather more scarlet than natural, but their texture was not altered.

Before proceeding to relate the experiments that have been performed with the salts of zinc, I would offer a few remarks on the facts which have been just described. The effect produced by small quantities of the salts of magnesia on the heart, is, as I have stated, to quicken the pulsations of that organ, and also to cause a marked difference in the character of the pulse, as shown by the diminutions of the oscillations of the column of mercury indicating the pressure in the arterial system. This alteration in the character of the pulse may depend on two causes ;—either that the ventricular systole requires a longer time for its completion, the blood being thus forced into the aorta more gradually ;—or it might be due to an increase in the elasticity of the parietes of the arteries. It is to the first of these causes that I am inclined to attribute the phenomenon in question, although the latter may participate in a slight degree in its production. That a longer systole of the heart is not inconsistent with its quickened pulsation, is evident; for we have only to suppose the period of repose shorter, and we may have the systole much lengthened, whilst the number of the contractions of the organ in a given time are increased.

*The Salts of Zinc.*—These salts are very closely allied to those of magnesia in their physiological action. When injected into the veins, in fact, the only difference that exists in the action of these two classes of salts is, that those of zinc produce the same effect as those of magnesia, even when exhibited in much smaller doses; the former also acting more powerfully on the nervous system. A solution, containing three grains of sulphate of zinc, when injected into the jugular vein, gave rise to a quickened pulsation of the heart ten seconds after its injection; the oscillations in the column of mercury were also diminished, and the pressure in the arterial system decreased; two minutes after the injection, it being less by a column of mercury equal to two inches; the action of the heart was also slower. Six grains, when injected into the veins, exerted a powerful influence on the heart; the pressure in the arterial system became diminished until it was only equal to a column of mercury of two inches. A solution, containing thirty grains of the salt, arrested the action of the heart eight seconds after it had been introduced into veins. On opening the thorax, the irritability of the heart was found to be more completely destroyed than in the experiments with magnesia.

On injecting a solution of this substance into the arteries, it is found not to exert any influence on the passage of the blood through the systematic capillaries. Sixteen grains introduced through the axillary artery destroyed life by the action it exerted on the nervous system; the heart continued beating for some time after respiratory movements had ceased. In the complete prostration of strength which follows its introduction into the veins, this salt agrees perfectly with the salt of magnesia. This prostration has been noticed by Orfila in his "Traité des Poisons," T. i. p, 576, where he states, that, after the injection of a quantity of this salt into the veins, the animal fell "comme une masse inerte." The sensibility does not seem affected, nor are there any convulsions, the animal lying, according to the expression of the French toxicologist, "dans un etat de calme parfait." The injection of a solution containing six grains of sulphate of zinc into the veins of a dog, weighing about eight pounds, was followed by complete prostration of strength. A solution containing three grains more arrested the action of the heart a few seconds after its introduction into the veins. On opening the thorax, slight movements were still taking place in the ventricles; the blood in the left side of the heart was scarlet; it did not coagulate.* The various experiments I have made with this substance would lead me to conclude that it exerts a more marked influence in destroying the irritability of the auricles than of the ventricles. In one case, the ventricles were found contracting rythmically, when the auricles were quite still.

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* This salt appears to possess the property of dissolving, or at least of preventing

*Sulphate of Copper.*—This substance, when injected into the veins, exerts a more decided action on the heart, than does the sulphate of zinc. The injection of a solution, containing six grains of the sulphate of copper, gave rise to a quickened and fluttering action of the heart ten seconds after its introduction. This was followed in forty-five seconds by the pulsations of the heart becoming much slower, and a great diminution in the column of mercury, indicating the pressure in the arterial system, which fell full two inches. A solution, containing fifteen grains of the salt, arrested the action of the heart twelve seconds after its introduction into the veins. On opening the thorax, immediately after death, the heart was found motionless, with the exception of slight contractions of the interventricular septum; no movements of the auricles were observed. The right side of the heart contained a considerable quantity of dark blood; the left cavities contained a smaller quantity, which was rather scarlet, but not of so bright a tint as arterial blood; for it appears the sulphate of copper interferes with the change of colour which the blood undergoes in its passage through the lungs, a point in which it differs from the salts of zinc. Injected into the arteries, this salt does not exert any influence on the passage of the blood through the systemic capillaries. Ten grains injected into the axillary artery, produced death by its action on the nervous system, without causing an immediate alteration in the pressure in the arteries.

The general symptoms which follow the introduction of the sulphate of copper into the veins differs from those produced by the salts of magnesia and zinc, by the absence of that complete prostration of muscular power which is so strikingly characteristic of the action of these latter salts. A solution containing three grains of the salt, when injected into the veins, gave rise to efforts to vomit two minutes after its introduction. On injecting a solution containing four grains, into the veins of the same animal, there was dyspnœa produced in fifteen seconds. The animal fell immediately, but continued moving its legs, which were rather

the coagulation of the fibrine of the blood. When blood taken from animals in whose veins this substance has been injected is allowed to stand, a perfectly clear and limpid solution of the fibrine is obtained, the colouring matter being precipitated apparently unaltered. In fact, the sulphate of zinc appears to exert but little influence on the colouring matter of the blood, for when injected into the veins in a sufficiently concentrated state, to completely change the physical character of this fluid, and even of the tissue of the lungs; yet the blood in the left side of the heart is found of a bright scarlet colour.

stiff, although there were no marked spasms or convulsions. After the animal had been lying on its side four minutes, it again rose on its legs, during violent efforts to vomit, but it soon fell down again. The action of the heart was arrested on introducing six grains more into the veins; respiration was suspended in forty-five seconds; the conjunctiva was sensible one minute after the suspension of the respiratory movements. After every respiratory movement had been suspended during two minutes, respiration again commenced, and continued uninterruptedly during a minute and a-half. The animal did not in any degree recover its sensibility, or the power of voluntary motion, during this return of the respiratory movements. In one experiment with this substance, a full respiratory movement took place, on making an incision into the thorax, four minutes after the animal had manifested any sign of sensation, and five minutes after the action of the heart had ceased: this movement was probably reflex; it was not accompanied by any marked irritability of the muscles, which, in fact, did not offer those movements which are generally produced in the muscular fibre, by the contact of air, and the irritation of the scalpel, immediately after death. This absence of irritability in the muscles after death, produced by the injection of sulphate of copper into the veins, as also the absence of irritability in the heart, has been noticed by Orfila. I have also observed that the same effect has been produced on the muscular fibre by the injection of the salts of zinc and magnesia.

*The Salts of Lime.*—I am not aware that any observations have been published on the action of these salts when introduced into the veins. In their action on the heart they resemble very closely those substances which have been already noticed. When injected into the veins in sufficient quantities, they arrest the action of the heart in from eight to twelve seconds. To produce this effect, a drachm and a-half or two drachms of the chloride of calcium or nitrate of lime are required. When injected in small quantities, the pulsations of the heart are rendered quicker, and the oscillations in the column of mercury are diminished. In their subsequent action on the heart, the salts of lime differ from the salts of magnesia, copper, and zinc, by their tendency to make the action of the heart permanently quicker, the rapidity of the pulsations being increased, until they are introduced in sufficient quantities to paralyse the heart. An examination of the thorax immediately after death discovers the heart more or less deprived of irritability. Sometimes the organ has been found perfectly motionless. The blood in the left cavities is always of a bright scarlet colour. When injected into the arterial system the salts of lime exert no action on the general capillary circulation, the pressure in the arteries not being affected.

On injecting a solution of chloride of calcium through the axillary artery, I have noticed a curious fact, that would tend to prove, that, if there be not regurgitation of blood into the left ventricle during its diastole, there at least cannot be any onward current in the ascending and transverse part of the aorta. The fact to which I allude is, the quickening of the action of the heart four seconds after the introduction of this salt into the axillary arteries, its pulsations being affected in the same manner as when the salt becomes applied to it, after being introduced into the veins; the short interval (only four seconds) elapsing between the injection of the substance into the arteries, and its action on the heart, precludes the idea, that the salt would have been applied to that organ, after traversing the general and pulmonary circulation. The only explanation of the facts that presents itself is, that the injection must have directly reached the origin of the coronary arteries, and was thus applied to the heart. The force with which the injection was pushed would undoubtedly favour this, as the tube inserted into the axillary artery was small; but this would have been readily overcome by any onward movement of the blood in the aorta. I have often observed the same phenomenon when injecting other substances into the axillary artery; but sometimes the heart remains unaffected, until sufficient time has elapsed for the blood containing the substance to go the round of the general and pulmonary circulation.

The general symptoms that follow the introduction of the salts of lime into the veins, differ from those produced by the salts of copper, by the prostration of strength not being so great, and also by the occurrence of spasmodic and convulsive movements. A solution containing six grains of nitrate of lime, merely produced an expression of pain when injected into the veins; the injection of fourteen grains was followed by a spasmodic affection of the diaphragm; this was manifested only during expiration, which was performed by two or three distinct efforts: the same phenomenon has been noticed three times: sometimes the animal appeared to cough two or three times during each expiration. Efforts to vomit are sometimes produced. When a considerable quantity of the salt (from thirty to forty grains) has been injected into the veins, the strength of the animal becomes affected; it either lies down, or walks about very unsteadily; the sensibility does not seem altered. When the salt is introduced into the veins in sufficient quantities to arrest the action of the heart, general spasm is produced in about fourteen seconds. This soon relaxes, and respiration goes on for forty or fifty seconds. The respiratory movements are then suspended, but recommence in about a minute, when eight or ten full inspirations generally take place. A few seconds before respiration ceases, the whole of the muscles of the body are observed to be in motion. These motions appear to be owing to irregular contractions of the fasciculi of the muscles, not affecting the whole of the muscle at once, for they do not give rise to any general movement. It resembles in fact, a sort of thrill running through the muscles, which is most perceptible in the muscles of the trunk, where it continues some few seconds after respiration has ceased. It will be seen that this phenomenon is much more strongly marked after the injection of the salts of strontia into the veins. In all the experiments I have made with the salts of lime, the lungs have always been found of a bright rosy tint;—in other respects their tissue has appeared unaltered. The colour of the blood in the left cavities of the heart, has always been of a bright scarlet, and very firmly coagulated, the salts of lime evidently favouring the coagulation of the blood.

*Strontia.*—The salts of strontia, when injected into the veins, destroy the irritability of the heart more readily than the salts of lime. In smaller quantities they render the action of the heart slower, and produce a diminution of pressure in the arterial system, immediately after their injection. After a few seconds, the pressure in the arteries again becomes augmented, and the oscillations in the column of mercury are increased. Ten seconds after the introduction into the veins of a solution containing ten grains of chloride of strontium, the column of mercury in the hæmadynamometer fell one inch and a-half, and appeared to remain stationary for two or three seconds; it then again rose, and fifteen seconds after the injection, it was two inches higher than before the introduction of the salt into the veins. The oscillations in the column were also much increased: before the injection, the systole of the heart only produced an oscillation of an inch in the column of mercury; it now oscillated three inches at each pulsation; the action of the heart was also slower. The introduction of forty grains into the jugular vein, arrested the action of the heart in fifteen seconds. On opening the thorax, both auricles were pulsating regularly; the ventricles were motionless; both the right and left cavities of the heart were full of blood; that in the left side was of a bright scarlet colour. On introducing a solution of chloride of strontium into the arteries, the pressure in the arterial system becomes augmented about four seconds after the introduction of the first portion of the injection. The column of mercury in the hæmadynamometer is rendered about two inches higher, which is sufficient to show, that the passage of the blood through the systemic capillaries is affected. A solution containing thirty-six grains of the salt, arrested the action of the heart twenty seconds after its introduction into the artery. Thirty grains had been previously injected into the arteries of the same animal.

The salts of strontia, when introduced into the blood, appear to act but slightly on the nervous tissue, the action of the heart being arrested previously to any general symptoms manifesting themselves. Even when injected into the arteries, these salts arrive at the heart in a sufficiently concentrated state to arrest its pulsations, without having given rise to any marked symptoms of their action on the nervous centres. In the experiment above alluded to, in which the heart was arrested by the injection of thirty-six grains into the arteries, the respiration continued uninterruptedly for three minutes after the action of the heart had ceased, and the conjunctiva was still sensible, two minutes after the arrest of the circulation: the animal seemed to suffer a great deal of pain, thirty seconds after the introduction of the salt into the arteries. Ten grains of nitrate of strontia injected into the veins, the animal being at liberty to move about, gave rise to no marked symptom. Sixteen grains of the salt arrested the action of the heart; the animal fell down ten seconds after the introduction of the salt into the veins; there were no convulsions, and the animal remained quite sensible for some time after the heart had stopped. There was expression of pain twenty-five seconds after the injection; the respiration continued for a minute and a-quarter; it then became suspended for a minute, and again commenced, six full inspirations taking place.

But the most interesting phenomenon which is produced by the injection of this salt into the veins, is the continuance of muscular movements after death; these movements last for a quarter of an hour or twenty minutes after death, giving rise to motions of the trunk and limbs. I have observed them to continue for forty minutes in the muscle that had been exposed on opening the thorax, and this, too, with sufficient vigour to move the ribs, although the temperature of the atmosphere was but 42° Fahrenheit. I propose to give a more complete analysis of this phenomenon, when treating of the action of the salts of baryta, which, together with the salts of lead, exert the same action on the muscular fibre.

*Baryta.*—The salts of baryta are very analogous in their action to those of strontia; in fact, the resemblance that exists between the action of these two classes of salts is quite as marked, if not more so, than that which has been noticed between the salts of magnesia and of zinc. The only difference appears to be, that the salts of baryta are much more poisonous than those of strontia; they are, in fact, the most deleterious substances, as far as regards their action on the heart, that I have experimented with. A solution containing a quarter of a grain of chloride of barium, affected the heart twelve seconds after its introduction into the jugular. The effect on the heart, and on the pressure in the arteries, was precisely the same as that produced by the injection of ten grains of chloride of strontium. On injecting two grains into the veins, the action of the heart was arrested in twelve seconds. On opening the thorax, the state of the heart was the same as in the animal which had been killed by the injection of the chloride of strontium: the auricles were contracting; the ventricles were motionless.

When injected into the arteries, the same effects are produced as when a salt of strontia is used. I shall merely, therefore, refer to the description of the action of this latter salt, without going into any details on the injection of the salts of baryta into the arteries. Their action on the nervous system is so slight, as not to give rise to any marked symptoms. When the heart is paralysed, the animal falls—general spasm comes on, which lasts for a few seconds—respiration is not generally arrested until two minutes after the action of the heart has ceased—the conjunctiva generally retains its sensibility about a minute and a-half after paralysis of the heart—the lungs are found of a bright scarlet colour, but their texture appears unaltered. Neither the salts of strontia or baryta, appear to exert any influence on the coagulation of the blood.

I shall now offer a few observations on one of the most striking phenomenon which follow the introduction of the salts of baryta into the veins. I allude to the continuation of muscular movements after death. I have already noticed this point, when speaking of the action of the salts of strontia; but as this interesting fact has not attracted the attention of previous observers, I have thought it better to give a few details relating to it. In every case in which I have injected the salts of baryta into the veins or arteries, (in all eleven times,) these muscular contractions have been noticed after death. They are never observed to take place with equal force over the whole of the body at the same time, but are always most marked in some particular set of muscles. I have observed them most frequently in the muscles of the thorax and anterior extremity; but I know of no set of muscles in which these movements have not been seen. They do not always take place immediately after death, the animal sometimes remaining quite still for some minutes, after which the muscles may commence contracting. These muscular contractions are sometimes observed at various parts of the body at the same time, or they may be confined almost wholly to one part, or they may affect different parts at different periods. In one instance I have observed them commence a few minutes after death in the muscles attached to the angles of the mouth; from thence they appeared to be propagated to the muscles of the ear, the orbit, and of the side of the face; then to the muscles of the neck, and lastly to those of the thorax and the muscles moving the anterior extremity, in which they did not take place till ten minutes after death. The force with which the muscles contract is sometimes considerable. I have seen the posterior part of the trunk moved by the contractions of the lumbar muscles, and have on two occasions observed the body pushed away, on furnishing a *point d'appui* to the sole of the foot. This last phenomenon took place ten minutes after the thorax had been opened. The longest period after death at which I have observed these movements take place spontaneously, has been thirty minutes, and this was in the muscles moving the vibricii or whiskers; but in those muscles which had been exposed on opening the thorax, I have seen vivid contractions forty minutes after death, and this when the temperature of the room in which the animal lay was at 42° Fahrenheit. As to the cause of these movements, whether they be owing to an effect produced by the substance on the nervous system, or to its direct contact with the muscles, it would be premature of me to give an opinion. There is one fact, however, which I have observed, which would tend to favour this latter opinion—it is, that when these substances had been injected into the arteries, the contractions are generally most marked in the limb, through the artery of which the injection has been introduced. No other substances that I am aware of, besides the salts of strontia, baryta, and lead, give rise to these movements.*

*Lead.*—The salts of this metal, in their physiological action, form a link between the salts of strontia and baryta, and those of silver and soda; they agree with the former, in their action on the heart and muscular tissue, and with the latter, by the effects they give rise to in the lungs. When a solution containing three grains of acetate of lead, was injected into the veins, the pressure in the arterial system became diminished in seven seconds; four seconds after this, the column of mercury in the hæmadynamometer regained its former height, and even indicated an increased pressure in the arteries; the action of the heart was rather quickened, and its oscillations less. On injecting a solution containing fourteen grains of the salt, the pressure in the arteries was first diminished, and then became much increased, the column of mercury being from three to four inches higher, about eighteen seconds after the injection; the action of the heart became slower, about two minutes after the injection, and the oscillations at each pulsation of the heart became increased. On injecting a solution containing a drachm of the salt, into the veins, the action of the heart appeared arrested in ten seconds, and the mercury in the instrument fell rapidly. The animal, apparently dead, lay perfectly still a minute and a-half after the injection, and remained so for two minutes; the heart again commenced pulsating, and the pressure in the arterial system was in a few seconds equal to a column of mercury of eight inches; the respiration was also renewed. On injecting another drachm of the salt, (making in the whole three drachms that had been introduced into the veins,) the action of the heart was arrested in ten seconds, but the pulsation of the auricles appeared to have been renewed after about a minute, producing no effect, however, on the pressure in the arterial system, which remained at zero. On opening the thorax, the right auricle was found contracting feebly, but no movements were observed on any other part of the organ; both cavities of the heart contained a great deal of blood; that in the left side was more scarlet than that in the right; but not of that bright colour which arterial blood ought to be. When introduced into the arteries, the acetate of lead is found to influence the passage of the blood through the general capillaries. A solution, containing six grains of the salt, when injected into the axillary artery, produced a sudden increase of pressure in the arterial system; in four seconds, the column of mercury, which, before the injection, was equal to from five to six inches, began rapidly to rise; thirty seconds after the injection, it was up to twelve inches; the respiration was arrested a minute and a-quarter after the injection; yet the pressure in the arteries diminished but slowly. Two minutes after respiration had ceased, the column of mercury was still equal to ten inches; at three minutes, it had fallen to six inches, the contractions of the heart continuing regularly, and producing oscillations of half-an-inch; at five minutes after respiration had ceased, the mercury had sunk to three inches and a-half; and at seven minutes, the pressure in the arteries was only equal to a column of mercury of two inches, the action of the heart being very weak. After having reached this point, it again became increased to six inches, on the animal taking a deep inspiration; the pulsations of the heart were also rendered quicker by this renewed arterialization of the blood. There was but one respiratory movement; and after this, the heart gradually became arrested as in asphyxia.

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* The action of the acetate of lead on the muscles, appears not to have escaped the careful observation of Haller, for I find a passage in Scheele's work—(Ueber die transfusion des Blutes, B. 2, S. 253,) in which he states, when alluding to the experiments performed by Sproegel with this substance, "that the irritability of the other muscles did not appear to have been so completely destroyed as that of the heart, on the irritability of which organ after death, Haller was unable to institute any researches." Unfortunately, I have not been able to find in any of Haller's works the original passage to which Scheele refers. The only other allusion I find to this subject, is in Orfila's work on poisons, where he states, that on opening an animal which had been killed by an injection of chloride of barium into the veins—"les chairs etoient palpitantes."

Experiments that have been performed on birds since this memoir was written, prove that these salts exert the same action on the muscular fibre of this class of animals as they do on that of mammalia.—J. B. April 23.

The general symptoms that this substance produces when introduced into the blood, are owing to two causes, either to its action on the lungs and heart, or on the nervous system; when injected into the veins, it kills by its action on the lungs, or by destroying the irritability of the heart; but when introduced into the arteries, it evidently proves fatal, by its action on the nervous system, with which it is brought into direct contact. Its action on the lungs is shown a few minutes after the introduction of the salts of lead into the veins, by the escape of a great deal of froth from the mouth ; this froth, having its origin in the air cells, speedily prevents the aeration of the blood, the bronchi and trachea being filled with it, and the animal thus perishes by asphyxia. After death, the lungs present the appearances observed in the first and second stages of pneumonia, their tissue being engorged and hepatized; livid spots were observed on the surface, and the air passages were either impermeable, or filled with a frothy fluid of a whitish colour, but slightly tinged with the colouring matter of the blood.* This secretion is formed in considerable quantities ; for although I have never been able to collect the whole that has been produced, yet I have certainly seen as much as four or five ounces escape at the trachea. In one experiment an animal was suffocated by this secretion, after only three grains of acetate of lead had been introduced into the veins.

The action of this salt on the nervous system is most strikingly shown when it is introduced into the arteries. In an experiment to which I have already alluded, respiration became suspended a minute and a-quarter after the introduction of six grains of acetate of lead into the arteries, (six grains had been previously introduced in divided doses), the animal lay apparently dead, with the exception of occasional movements of the tail during the space of seven minutes ; these movements of the tail were very violent, but were not accompanied by any movements in other parts of the body; at the end of seven minutes, however, the animal gave a deep inspiration, and then lay perfectly lifeless. I have often observed this renewed respiration follow the injection of the acetate of lead into the veins ; but in these cases it took place about two minutes and a-half after respiratory movements had been suspended. When introduced into the veins in sufficient quantity, the acetate of lead arests the action of the heart, by its direct influence on that organ. The quantity required to produce this effect seems to vary in different cases; in the experiment above alluded to, three drachms were injected into the veins, before the action of the heart was stopped, whilst I have in another instance seen the heart lose its irritability, by the introduction of only twelve grains of the salt into the venous system. I would observe, that, in the former experiment, the animal was larger, weighing about twenty pounds; and also that the salt was dissolved in spring-water, acidulated with a small quantity of acetic acid, distilled water being used in the other experiments. As I have before stated, this salt gives rise to contractions in the muscular fibre after death; but not in so striking a manner, as do the salts of strontia and baryta. The acetate of lead alters the physical character of the blood, no perfect coagulation taking place, when it has been injected into the veins.

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* A superficial analysis of this fluid shows that it contains a considerable quantity of albumen, and by incineration lead can be readily detected in it.

*Silver.*—The salts of silver agree with those of lead in their action on the systemic capillaries. They exert a more marked action on the lungs; but do not appear to be so deleterious to the heart. The injection of a solution, containing three grains of nitrate of silver, into the veins, causes at first a diminution, and then an increase in the pressure in the arterial system. After a short time, the pressure in the arteries was again diminished, the blood being no longer aerated, owing to the production of a great quantity of frothy fluid in the air passages. The animal died from asphyxia, about twelve minutes after the introduction of the salt into the veins. On opening the thorax immediately after respiration had ceased, the heart was found pulsating rythmically, and continued contracting for ten minutes. The right auricle was irritable half-an-hour after the thorax had been opened. If the salt is introduced into the veins in larger quantities, the passage of the blood through the lungs is suddenly arrested. On injecting into the veins a solution, containing a drachm of the salt, the column of mercury in the hæmadynamometer began to sink ten seconds after the injection. At thirteen seconds, it was equal to only two inches; nor were any oscillations produced in it, although the heart continued beating strongly. The pressure in the arteries never again rose, no blood being sent into the arterial system, although the heart could be seen to be beating violently, by the movements it produced in the parietes of the thorax. The heart was exposed three minutes after the injection; the left ventricle was still contracting feebly. The right side of the heart was so distended with blood, as to render contraction impossible. The left cavities appeared to have contracted on their contents, as much as the distended state of the right side would allow. There was a small quantity of dark blood in the left ventricle, which was coagulated, though not very firmly, having been evidently slightly affected by the salt, a small portion of which must have found its way to the left side of the heart; on opening the right ventricle, more than seven ounces of dark grumous blood escaped from it, and from the vessels leading to it. I have, on one occasion, seen the action of the heart arrested after this substance had been introduced into the veins. It was, when a solution containing twelve grains of the salt had been used, the jugular veins having been divided immediately after the injection, in order to prevent the brain from being affected, by the great venous congestion that supervenes on the arrest of the passage of the blood through the lungs. By this means, respiratory movements were not immediately arrested, and the blood containing the salt passed into the left side of the heart, and became circulated over its parietes, giving rise to an arrest of its contractions ; but, even in this case, the ventricles manifested signs of irritability ten minutes after death.

When introduced into the arteries, the salts of silver evidently give rise to a great obstruction in the passage of the blood through the systemic capillaries. A solution containing two grains of the acetate of silver, when introduced into the arterial system, gave rise to an increase of pressure equal to a column of mercury of six inches, two grains more injected into the arteries were sufficient to produce death, giving rise to a pressure equal to fifteen inches of mercury. The heart was stopped by asphyxia about five minutes after the respiration had ceased.

When the salts of silver are injected into the veins, the nervous system appears to be affected solely by the action of these salts on the lungs ; for I have never noticed a symptom which I could attribute to their direct action on the nervous tissue. When the quantity injected is small, the circulation through the lungs is not arrested, but a secretion takes place, which, by obstructing the air-passages, prevents the aeration of the blood, thus indirectly affecting the nervous system. This secretion, however, is not always produced, and yet even then the animal seems to die of asphyxia, owing to extensive changes produced in the tissue of the lungs. When the quantity of the salt is sufficient to arrest the pulmonary circulation, the nervous system becomes violently affected, owing to the congestion which immediately takes place in the veins. In a few seconds, opisthotonos comes on, and the spasm relaxes in a short time by the death of the animal. The effects that follow the introduction of the salts of silver into the arteries closely resemble those produced by the acetate of lead, when injected into these vessels. Respiration was suddenly suspended by the injection of two grains of nitrate of silver into the arteries. This, however, was the second injection ; the respiratory movements were renewed three minutes after they had been suspended, five or six full inspirations taking place. I am inclined to think the symptoms which manifested themselves in this case, as well as those produced by the salts of lead when injected into the arteries, are owing to the great increase of pressure in the arterial system. The influence which the salts of silver exert over the passage of the blood through the lungs, is evidently much greater than that of the salts of lead, for I have never seen the circulation of the blood through these organs totally arrested by any dose of the latter salts.

*Soda.*—The salts of soda bear a close resemblance in their physiological action to those of silver. In the memoir I read at the Academie des Sciences at Paris, to which I have before alluded, I have related experiments showing the action of these salts when injected into the veins and arteries. As might be expected, the quantities required to produce the same effects are much greater when the salts of soda are used, than when those of silver are injected. I have nothing to add to what has already been published on this subject, except the following experiment, which I performed at the suggestion of my esteemed friend, Dr Sharpey. It furnishes an additional proof of the correctness of the opinion that I had advanced, as to the cause of the violent nervous symptoms that manifest themselves when the pulmonary circulation is arrested; and it also shows how slight the action of the salts of soda must be on the nervous tissue. The animal was prepared by exposing the two jugular veins. A solution containing three drachms of nitrate of soda was injected into the venous system,—a quantity more than sufficient to arrest the passage of the blood through the lungs. A few seconds after the injection, violent opisthotonos came on. This was instantly relieved by dividing both the jugular veins,—congestion in the brain being thus prevented. The animal lost a great deal of blood, but, notwithstanding this, it survived the experiment two hours. During this time, no nervous symptoms were observed ; the respiration continued regular, there were no convulsions, and sensibility was unimpaired ; in fact, the animal seemed only to be suffering from loss of blood, the presence of so large a quantity of soda in the blood being apparently in no way injurious, except by the action it exerted on the lungs. At the end of two hours, the animal died asphyxiated, owing to the air-passages becoming filled with a frothy secretion.* Neither the salts of soda or silver exert any marked action on the general muscular tissue. The irritability of the muscles after death appears to be rather increased.

It now remains for me to notice the action of the salts of ammonia and potassa, when injected into the vascular system. The physiological action of these substances, does not allow of their taking a place in that natural arrangement we have hitherto pursued, and by which a substance has always stood in close physiological relation to that which preceded it, and that which followed it. There is undoubtedly a great difference between the action of the salts of magnesia and those of soda, yet have we observed the phenomena which characterize the action of these substances, gradually manifesting themselves, or disappearing; becoming more strongly marked or less perceptible ; so that although we find no one phenomenon common to the substances which occupy the extremes of the series, yet we are unable to select any two substances placed together in the intermediate part of the scale, which, in their physiological action, do not present many striking points of resemblance.

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* It would appear that Orfila has noticed the production of this frothy secretion, both when the salts of lead, and those of silver had been injected into the veins. He, however, seems to have attributed its origin to the stomach, as, he says, the animal vomited some whitish substance, together with a great quantity of frothy fluid.

*Ammonia.*—The salts of ammonia, like most of those substances we have hitherto examined, exert, when injected into the veins, a powerful action on the heart: they differ, however, from the other substances, with which they may agree in this respect, both by their influence on the systemic capillary circulation, and by the general symptoms they give rise to. When a weak solution of the salts of ammonia is injected into the veins, the action of the heart becomes quickened, and the pulse smaller, a few seconds after the injection; the pressure in the arteries soon becomes increased, owing to the passage of the blood through the systemic capillaries being impeded. A solution containing six grains of nitrate of ammonia, caused an increased pressure in the arterial system fifteen seconds after its injection, and at thirty-five seconds, the column of mercury, which, before the injection was from four to six inches, rose to eleven inches:—this pressure soon became reduced, and the action of the heart irregular, great oscillations taking place in the mercury. A solution containing forty grains of the salt, when injected into the jugular vein, caused an augmentation in the pressure in the arterial system, the column of mercury rising as high as fourteen inches a few seconds after the injection. The action of the heart was arrested ten seconds after the introduction into the veins, of a solution, containing two drachms of the salt. On opening the thorax, the auricles were contracting rythmically, the ventricles appeared to have totally lost their irritability; both cavities of the heart were full of blood, that in the left side was scarlet, and firmly coagulated, that in the right was of the ordinary colour of venous blood. The alkali itself in much smaller quantity produces the same effects. A solution containing twenty drops of a saturated solution of ammonia, arrested the action of the heart.

When injected into the arteries, the salts of ammonia caused a great augmentation in the pressure in the arterial system. A solution containing two drachms of the nitrate of ammonia, arrested the action of the heart a minute after it had been injected into the axillary artery, respiratory movements continuing forty-five seconds after the heart had stopped.

The salts of ammonia appear to exert a powerful action on the nervous system, agreeing in this respect much more closely with poisons derived from the organic kingdom, than with any inorganic substances whose action I have yet investigated. Fourteen seconds after the injection into the veins, of a solution containing ten grains of nitrate of ammonia, the animal fell on its side, affected with slight convulsions. After lying on the ground for half-a minute, it rose, and did not appear to suffer the least from the injection; the introduction of ten grains more into the veins, gave rise to similar symptoms; the animal fell, but was again on its legs thirty seconds after the injection, the action of the salt being apparently due to its contact with the nervous tissue, and passing off as soon as blood which does not contain the salt, becomes again circulated over the nervous centres. Some minutes after the injection, the hind legs appeared to be partially paralysed, and after this had passed off, first one fore leg, and then the other, appeared to suffer in the same manner. Introduced into the veins in larger quantities, these salts appear to deprive the animal of the power of controlling its own movements; the whole body becomes violently convulsed; these convulsions very much resemble those produced by strychnine, and like these, can be called out by the slightest jar or noise; the respiratory movements remain unaffected, and the sensibility appears unimpaired, even in the midst of the strongest convulsions. In two instances, after death produced by the salts of ammonia, I have observed a sort of convulsive movement of the left auricle, which was in violent motion, without, however, causing any regular contraction, the movement seeming to part from many distinct points.*

*Potass.*—The accounts I have already published of the action of the salts of potass, (see Arch. Gen. de Med. Nov. 1839), will enable me to pass them over, with but a slight notice of their action on the vascular system. In this respect they exactly resemble the salts of ammonia, producing the same action on the general capillaries, and on the heart; both these substances appear also not to exert the least action on the lungs. In their action on the nervous system, there is a marked difference between the salts of potass and those of ammonia,—the violent convulsions which follow the introduction of the latter class of salts into the veins, never being observed when the salts of potass are injected. After the injection of six grains of the bicarbonate of potass into the veins, I have seen the animal fall on its side, the posterior extremities slightly convulsed, and after a few seconds again rise. On introducing an additional quantity of the salt, the heart was arrested, the salts of potass, after those of baryta, being the most fatal to the action of the heart.

Having now related the more important facts that have been observed in my experiments, I shall conclude by offering one or two observations which they appear to suggest.

The most curious fact which a consideration of the above experiments presents to us, is the close connection which appears to exist between the physiological action of these substances and their chemical properties. The property to which I more particularly allude is that of isomorphism. The analogy in the physiological action of isomorphous compounds, was first forced on my notice, by the perfect resemblance that exists between the salts of silver and of soda in their action on the animal economy when injected into the veins; differing as these salts do in their sensible chemical properties, but closely connected as being isomorphous. Farther investigation soon proved to me that this fact was of far more importance than I had anticipated, by showing that most striking points of resemblance exist generally beween isomorphous compounds in their action on the animal tissues, when introduced directly into the blood.* In the present state of chemistry, it would be useless to attempt to derive from this fact any farther generalization, for the doctrine of isomorphism itself is still in a very imperfect state.

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* Convulsive movements caused by the injection of hydrochlorate of ammonia into the veins have been noticed by previous observers.

Before quitting this point, I would recall an observation I made in a memoir read at the Académie des Sciences in June 1839, and which follows as a corollary from the fact of the analogous action of isomorphous compounds, although I had no idea at that time that such was the case. In speaking of the connection between the chemical composition of substances, and their physiological action, I observed—"Ce rapport n'est pas il est vrai tel que l'etat actuel de la science des affinités chimiques nous l'eut fait prevoir, car il est evident, que les decompositions effectuées dans le sang, par ces sels, decompositions sur lesquelles roule toute leur action physiologique, il est evident dis-je, que ces decompositions dependent de la base du sel, et ne sont que peu modifiées par la combinaison de cette base avec les acides, même les plus puissants." Should a more extended series of researches prove, that the identity which I have noticed in the physiological action of isomorphous compounds does not in all cases hold good, yet I think that the facts above related are sufficient to show that there exists some intimate connection between the chemical properties of substances, and their physiological action, the investigation of which promises to furnish a rich field for physiological researches.

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* There is apparently an exception to this rule in the salts of lead, which, although agreeing with those of baryta and strontia, in most of the phenomena they present, yet exert an analogous action on the pulmonary tissue with the salts of silver, with which they are not isomorphous; but it has been remarked, that there exists a striking analogy in the combinations which the oxides of these two bases form with organic compounds; an analogy which does not exist between the oxide of silver and any other base. There is also a difference between the action of the salts of potass, and those of ammonia on the nervous tissue; for although these substances exert the same action on the heart and the systemic capillaries, yet the violent nervous symptoms that follow the introduction of the salts of ammonia into the veins are never produced by the salts of potass. The peculiar action of the salts of ammonia on the nervous tissue,—an action which connects it in its physiological relations with organic poisons,—is interesting when we consider the chemical composition of ammonia, standing as it does between organic and inorganic compounds.

Fig. 1.

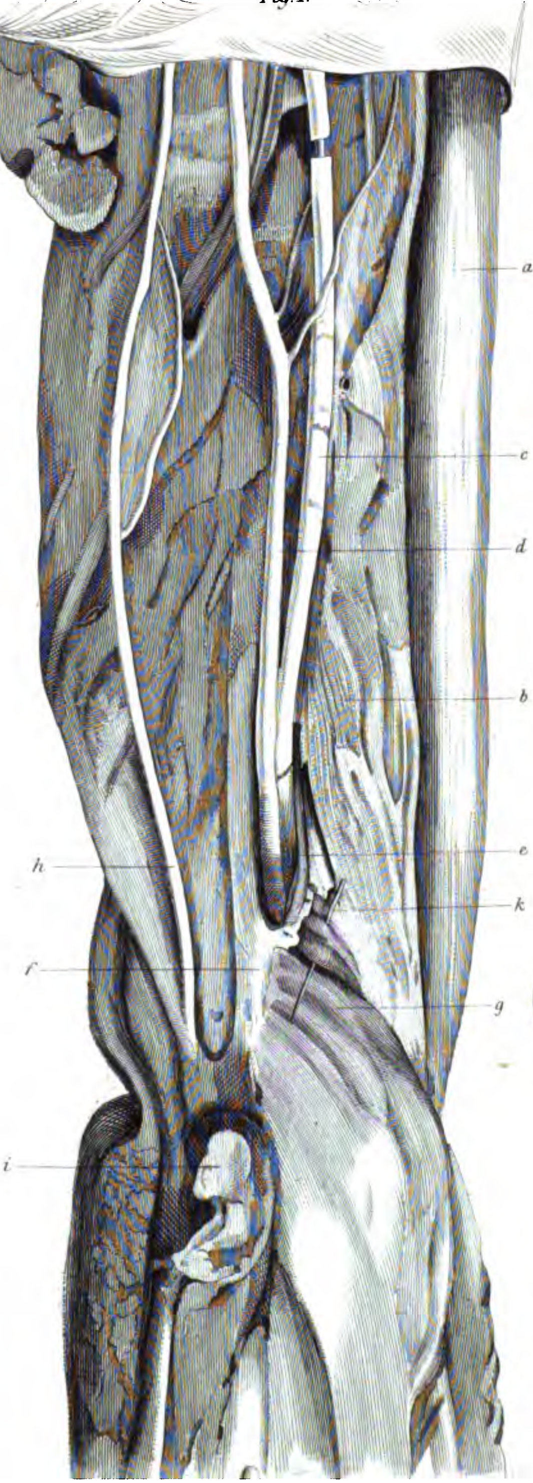
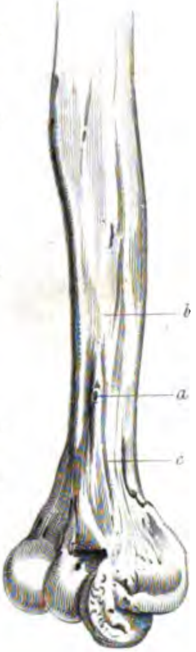


Fig. 2.



## Art. VI.—*Contributions to Anatomy and Physiology; communicated at various times to the Anatomical and Physiological Society in Edinburgh.* By R. Knox, M. D. Lecturer on Anatomy; Corresponding Member of the French Academy of Medicine; Fellow of the Royal College of Surgeons, and of the Royal Society in Edinburgh, &c. &c.

### No. 1. *On the occasional presence of a Supra-condyloid Process in the Human Humerus.*

During the early period of the present winter, accident put at my disposal the entire carcase of a very fine specimen of the jaguar or American panther. It had belonged to the celebrated Carter, who exhibited here along with Mr Ducrow, displaying his astonishing command over animals whose natural ferocity of temper had led mankind very generally to suppose that such familiarity with the larger carnivora was not only fearfully hazardous, but even impossible to attain. During the course of the exhibition, Mr Carter's favourite jaguar died of acute inflammation of the right lung, and the carcase being of no use, was very kindly sent me by Dr Middleton, who obtained it from him for that purpose. In the course of the dissection of some of the more interesting points in the anatomy of this animal, I occasionally requested my class to examine those points for themselves, opportunities for doing so on so large a scale being very rare. I pointed out to them the elastic ligament supporting the claw in continual extension, excepting when acted on by the flexor muscles; but more especially I desired their notice to the presence of that foramen or hole in the humerus bone, a short way above the inner condyle, and formed apparently by a supra-condyloid process projecting from the shaft of the humerus downwards and forwards, until it unites itself to the condyle. Through this grooved hole or short canal, so formed, there passed the median nerve and humeral artery on their way to reach the bend of the elbow,—an arrangement which every comparative anatomist knows to be common enough in many mammals, and more especially in the carnivora. That such a structure should ever occur in man seemed somewhat unlikely; nevertheless, I was aware that the foramen had been asserted to be present by M. Majendie, if I recollect right, in certain Bosjemen skeletons, and if so, I presumed would be found to be formed by a supra-condyloid process similar to what prevails so often in the carnivora. It happened almost at the same time that a friend had presented to me the cranium of a native of Polynesia,* and, thinking it a favourable occasion for making some remarks on the peculiarities of this and of some other human races, I submitted the cranium, together with many others, to the Anatomical and Physiological Society. As it is not my intention to reproduce what I said at that time respecting these races, I shall confine my remarks here strictly to what I then said respecting varieties in the form and anatomy of the human humerus. These remarks were nearly as follow :—

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* A cranium belonging to one of the party who attacked and killed our immortal circumnavigator, Cook.

"Some physiologists had supposed that, in certain races of men, the humerus bone presented a form specifically different from others, as the yellow races of Africa, for example, quoted by M. Majendie, in which race it had been asserted that there existed a supra-condyloid process and foramen in the humerus. My own opinion was rather against this view as drawn from the humerus; first, because I did not believe the character to be a constant one, and secondly, because approaches to the same structure might be found in many European arms. In fact, several specimens of the humerus on the table of the society taken at random from my own museum, showed distinctly enough a short process, which, if accidentally elongated, as might happen in some individuals, would imitate very exactly the same conformation in the tiger, jaguar, &c. In the character of those specimens of the human humerus which possess a rudimentary supra-condyloid process, there was a remarkable circumstance to which I begged leave to call more especially the attention of the society: running from the process just alluded to, might be seen two ridges and a groove proceeding downwards towards the inner condyle. This groove, I ventured to conjecture, was for lodging the humeral artery and median nerve in those cases wherein the process accidentally possessed a considerable extent. I frankly admitted that I had never seen such a case, but felt confident that, happen when it would, the artery and nerve would be found to run behind and on the inner or ulnar side of the process, and would thus occupy the groove in question."

At the time I made this statement, I was quite aware that it was opposed to what we know of the usual course of the artery and nerve; but I felt assured, that either *the analogy* drawn by most German anatomists between this rudimentary process in man and the much larger one found in the carnivora, was well founded or it was not;* and if the former, that the course of the nerve and artery would be accommodated to this new osseous arrangement and follow the law of *deformation* as strictly as our structures obey usually the laws of formation. Now, it happened by a singular coincidence, that within two days after this communication was made to the society, a case actually occurred to bring the opinion to the test. The left arm of a stout muscular middle-aged man was being dissected for demonstration at the morning lecture on the muscles, nerves, and arteries of the part. In the course of the dissection the *pronator teres* muscle was observed to have an unusually high origin; and on looking attentively at the structure, my assistant immediately called my attention to an anomaly corresponding strictly with what I had predicted two nights previously to the Anatomical Society, viz. the presence of a supra-condyloid process: its connection with the inner condyle of the humerus by means of a ligament or aponeurotic expansion, *and the consequent deviation of the main artery and median nerve from their usual course, in order to pass behind this process in the groove, half osseous, half ligamentous, thus formed*, afterwards to return, a little lower down, so as rapidly to regain their usual relative position in the bend of the elbow; in short, the precise anatomy of the arm of the jaguar, with this difference merely, that in the latter the supra-condyloid canal is entirely osseous, whilst in man it is only partly so, the process not extending so as to unite itself by bone with the condyle.

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* These and such analogies are habitually carried much further by German than by sound British anatomists. A hasty glance at the plates of a German thesis by Dr Otto, would seem to show that he extends these analogies to the slight overlapping occasionally occurring in the bones of the human cranium; but I have not yet had time to examine his ingenious work with sufficient attention. It is quite true, however, that the bones of the human adult cranium do occasionally overlap each other, —*occasionally* thus imitating what we find to be a constant law in many species of quadrumana and some other mammalia.

The accompanying sketches will no doubt explain in a more interesting mode to all readers, the curious anomalies in the human arm of which it has been the object of this brief memoir to give some account.

Plate III. Fig. 1. Anterior view of the bend of the elbow (left arm) in an adult male; the preparation is in my possession.

*a.* The biceps muscle.

*b.* The brachialis flexor.

*c.* The humeral artery in the lower third of the arm.

*d.* The median nerve.

*e.* The supra-condyloid process running from near the inner margin of the humerus downwards, and inwards towards the inner condyle; it measures about three-quarters of an inch in length, but does not reach the condyle by about an inch and a quarter.

*f.* A tendon or ligament running from the free extremity of the process to the inner condyle of the humerus, nearly parallel with the internal inter-muscular ligament, and united intimately with it, particularly below.

*g.* That portion of the *pronator teres* which usually arises from the anterior surface of the internal inter-muscular ligament, but which in this arm arose from the above described tendon, *f.*

*h.* The ulnar nerve.

*i.* Inner condyle of the humerus.

*k.* A pin passed under the median nerve and artery, so as to raise them up from off the surface of the brachialis muscle, immediately after they have passed under the supra-condyloid process, and towards its inner side.

Had the process been of an extent sufficient to reach the condyle, it would, in every respect, both as regards the osseous structure, and as regards the course of the median nerve and artery, resembled strictly the arrangement we meet with in the panther; a startling proof of the strength of the analogies subsisting occasionally between man and the lower animals, and an undeniable argument of the existence of a general scheme or plan, embracing the whole range of the animal kingdom, even to a minuteness of detail quite inconceivable by those who adopt the views of the physiology of the Bridgewater Treatises.

Plate III. Fig. 2 shows the same structures in the human humerus, but in a more rudimentary state. It is the right humerus: *a.* marks the supra-condyloid process; *b.* the groove leading towards it; *c.* the groove leading downwards from it ; it is around this tubercle or process, and in this groove that the median nerve and humeral artery lie, when the process has an extent or developement sufficient to influence the surrounding structures.

## No. 2. *Observations on the probable uses of the Round Ligament of the Thigh-Bone in Man.*

I NEED scarcely remind any medical man of the various structures by means of which nature has strengthened and endeavoured to perfect the ileo-femoral or hip-joint in man ; fitting it to perform motions which at first sight appear universal, (although very far from being so) ; and yet by powerful ligaments, and by other means checking these motions when proceeding too far, or in a direction likely to stretch, injure, or destroy the textures.

A careful review of all these structures, not merely of their descriptive anatomy, but of their anatomy, combined with physiology and pathology, appears to me calculated to lead to very useful practical conclusions; and I trust that some competent reviewer may do so. Being without leisure to make the attempt, I shall limit myself rather to the bringing forward a few detached observations in respect to certain of the structures composing this very interesting joint in man.

In the composition of the human hip-joint we find the following structures : 1. Osseous surfaces and cartilages of incrustation ; 2. A capsular ligament, and its interior strengthening fasciculus, described under a variety of names ; 3. A cotyloid fibro-cartilage or ligament and its appendages ; 4. An inter-articular or round ligament, which, instead of being round, is rather triangular, and somewhat twisted on itself ; 5. A fibrous membrane immediately adhering to, and inclosing the neck of the femur, usually called the reflected ligament ; 6. A synovial capsule, with a fatty appendage, partially occupying the notch in the acetabulum.

Of these various structures, it might at first appear that all are absolutely necessary or essential to its safety ; but experience shows that this is not strictly so, inasmuch as the so-called round ligament has been found absent in a healthy human hip-joint, and yet the joint would seem to suffer neither a loss of strength nor of flexibility. I use the term *seem* by way of caution or qualification ; because, as the absence of the ligament could scarcely be suspected prior to the *post mortem* examination, and not even ascertained until the capsular ligament had been laid open, or the interior of the joint fully explored, so, in some respects, it is impossible to say in how far the hip-joint of a person, in whom this ligament happened to be congenitally absent, was in every respect equal to one more regularly formed.

This question requires a more careful analysis than appears at first sight necessary. Neither is it easy to arrive at any decisive results in consequence of a want of materials. I shall therefore state what I have myself observed, in hopes that others of more extended or a more varied information may take up the subject in a wider view. During my labours in the practical rooms in the course of the present winter session, I accidentally mentioned to a very distinguished and talented student, (Mr Hay of Newcastle,) that, in dissecting the hip-joint on which he was at the time engaged, I should be happy to point out to him some views I had adopted a few years ago in reference to the uses of the round ligament, provided he spoke to me at the time he was about to open the joint. Accordingly, having prepared the capsular ligament, dissecting and examining it carefully, an incision was made cautiously into it anteriorly, so as to bring the interior of the joint into view, and I laid hold of the femur to explain to him the functions of the round ligament, such as I supposed them to be. On gently rotating the limb outwards, it was immediately discovered that the round ligament did not exist, all the other structures in and about the joint appearing at the same time, on a first and superficial view, to be perfectly sound.*

As this was the first occasion on which I had ever observed the round ligament to be wanting in a hip-joint, otherwise perfectly sound, and bearing no appearances of having previously suffered from dislocation, or from disease, chronic or acute, I proceeded to examine the joint with very great care; the muscles surrounding the joint were healthy, and of the usual size; and the capsular ligament bore no marks of rupture or previous injury, to warrant the conjecture that the joint had ever been dislocated. On the other hand, it was easy to see that the joint could not be called sound in every respect; in fact, that appearance, which some consider morbid, and others not, viz. atrophy or *usure* of the cartilages, had commenced, and made considerable progress, as well on the head of the femur as on the corresponding acetabular surface. The only vestige of a round ligament was a fine fibre, like a piece of thread lying coiled up, on the surface of the fatty appendage in the notch, and unconnected with any other part whatever. The opposite joint was normal.

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* Having taught anatomy now for about sixteen years, and devoted most of my time to the superintendence of my practical rooms, I need hardly add, that a very great number of joints have been opened either by myself, or by others in my presence. I must be within limits in saying that the joint must have been opened before me at least 500 times.

Many questions might be put here, difficult, I apprehend, to answer. The appearance of the joint forbids us supposing it to have been a congenital deficiency; and, moreover, what proofs have we that the round ligament of the hip-joint is ever congenitally absent? The following different views may, I think, be entertained of this and of similar cases.

1. Was it simply one of original malformation whose principal features were, an absence of the round ligament? To this view there are many objections, admitting fully, as I do, the possibility of a congenital absence of the round ligament in a few rare cases; but I do not know where the history of such cases accurately recorded, is to be met with; yet, as the laws of deformation, seem to be nearly as regular as the laws of formation, I know of no reason why occasionally that arrangement, which we find constantly in the elephant and some other mammals, should not occasionally occur in man; in fact, we know that such is the law with regard to many other structural arrangements; and may, and probably does hold good, in respect to the occasional absence of the round ligament in man.*

2. Dismissing this view as inapplicable to the present case, we may ask, in the *second* place, Was the destruction of the ligament owing to an old dislocation of the joint, which, having been reduced many years ago, left no traces of the accident recognizable in the capsular ligament, but had yet effectually destroyed the round ligament? This view might be entertained with a greater show of proof, if surgeons had recorded faithfully the precise condition of the joint after ancient dislocations; but this they have not done, so far, at least, as I know.

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* Every comparative anatomist knows that the round ligament is wanting in certain species of mammals, and in some whose joints are cast in the strongest mould. I leave the animal mechanic philosophers to get over the difficulty in their own way. Their arguments figure best in popular treatises.

3. Was the destruction of the ligament owing to a sudden wrench sufficient to snap the ligament, but unequal to the dislocation of the joint, with it constant accompaniments, viz. rupture of the capsular ligament and displacement of the head of the bone? This view of the case appears to me a probable one; but previous to discussing in how far it explains all the appearances, I may just mention a fourth, which many may be disposed to adopt, viz. the ascribing the whole appearances to that peculiar change called atrophy of the cartilages and synovial membranes, unaccompanied by any positive ulceration; unaccompanied by the formation of purulent matter; in short, resembling much a mere mechanical destruction of these structures, followed by the porcelain ivory deposit on the bone; a process seemingly set up by nature to prevent the utter destruction of the joint. For it is manifest that, whatever destroyed the cartilages, might also destroy the round ligament; or the round ligament having been first snapped through, *usure* or wasting of the cartilages, and the porcelain deposit would necessarily follow; and, in this way, I feel disposed to combine in some measure both views.

The difficulty, then, is to determine which change preceded the other; whether the atrophy of the cartilages led the way to the destruction of the ligament, as it most assuredly has preceded the porcelain deposit visible on the head of the femur, and corresponding acetabular surface; or whether these changes were preceded by, and were in some measure caused by a rupture of the ligament. Both views are, in my own opinion, equally accurate, and probably it may appear to some that their farther discussion could lead to no useful practical result; but I am disposed to dissent from this opinion, both in regard to this joint, and in respect to certain changes connected with the inter-articular tendon of the shoulder-joint; but shall limit myself here to a very few, and those brief remarks, reserving a fuller discussion of the matter for a memoir, which I trust soon to be able to present to the society, on atrophy of the cartilages. My reasons here for imagining that a rupture of the round ligament preceded in this case the subsequent changes in the joint are derived from the following considerations, viz. the functions of the ligament, and the adequacy of the accident to give rise to the subsequent changes within the joint.

Ever since I taught anatomy I have been much struck with the contradictory statements, in respect to the uses of the round ligament of the hip-joint in man. My late colleague, Dr John Barclay, used to say, that the functions of the ligament seemed to be " the restoring the head of the bone to a right direction, when it had partially quitted, or was disposed to quit, the cavity of the acetabulum, and the maintaining it in that direction so as to replace the head of the femur readily in its socket under a variety of circumstances." An opinion of this kind can be maintained only with reference to such cases as those described so well a very short time ago by Mr Stanley, to the Medico-Chirurgical Society of London, to which cases I may afterwards revert.

M. Boyer's account of the anatomy of the round ligament is extremely minute; he sums up its use by stating, " the round ligament is adapted to prevent the femur leaving the cotyloid cavity upwards and outwards *(en haut et en dehors.)*"

M. Boyer was perfectly aware that the movements of extension and adduction are extremely limited; " the first, he remarks, because the obliquity of the cotyloid cavity is such, that the posterior part of the neck of the femur quickly meets its edge, by which it is arrested, the second, on account of the mutual resistance offered by both thighs."

Any critical remarks on these, M. Boyer's opinions are rendered unnecessary by what I shall endeavour to show to be the real uses of the ligament, experimentally and under a considerable variety of circumstances. All M. Boyer's views may be admitted, and still much be left unsatisfactory in respect to the uses of the ligament in question.

M. Meckel thinks that the round ligament is calculated " to oppose luxations upwards, outwards, and downwards ;" but he thinks that the femur might quit the cotyloid cavity forwards without this ligament being ruptured. I may briefly remark once for all, in spite of M. Meckel's high authority, that the round ligament has not the slightest power in preventing the head of the femur from quitting the acetabulum downwards.

Sir A. Cooper, in his great and deservedly celebrated work on dislocations and fractures, has expressed in a number of passages scattered throughout that work, his opinions regarding the uses of the round ligament. At page 67, for example, he says, " this ligament has a tendency to prevent dislocations in all directions, but particularly the dislocation downwards, for when the thighs are widely separated from each other, as in fencing, the head of the left thigh bone would be in danger of slipping from its socket, but that this ligament prevents it, and this example of its use shows the principal reason of its formation."

Now, the more I study the anatomy of the joint, and the oftener I experiment on it, the greater difficulty do I experience in comprehending this view of the uses of the ligament; whilst, on the other hand, I have arrived at precisely opposite conclusions. I shall therefore merely add at this part of my memoir a practical remark I find recorded in the same work, viz. that in every case of dislocation of the hip-joint, in which an opportunity occurred of a *post mortem* examination, the round ligament was always found lacerated, or rather torn completely through; but I can find no materials here or elsewhere to satisfy me that, after such laceration, the round ligament will again unite even after the complete reduction of the dislocation.

My object not being to write a full history of all that has been done and conjectured respecting the uses of the round ligament, I shall content myself with quoting the recorded opinions of Cruveilhier, Mayo, and Blandin.

The first of these anatomists adopted entirely the views of M. Gerdy; he thinks that, "however small in extent the movement of adduction may be, the interarticular ligament is of necessity put on the stretch," "or il resulte de cette distension, suivant l'observation judicieuse de M. Gerdy, que la tete de femur est detachée du fond de le cavite cotyloide, par une sorte d'enroulement du ligament interarticulaire sur cette tete; la tete du femur vient donc appuyer contre la capsule fibreuse," &c.

But observations made directly on the joint itself disprove this opinion of M. Gerdy, adopted by M. Cruveilhier, showing that these distinguished observers had not drawn that nice distinction between simple *adduction* of the femur and *rotation;* or adduction combined with *rotation* outwards or inwards: when this distinction is borne in mind, a very different conclusion is arrived at in respect to the functions of the ligament. M. Blandin's opinions respecting the uses of the round ligament are also founded on the pathological views of M. Gerdy. I shall quote the passage textually, as it is quite possible I may have mistaken or misapprehended its author. "Cette luxation (ileo-femoral) d'après la structure de l'articulation, ne semble guere possible qu'en bas et en dedans, et pourtant l'observation demontre que cette en haut et en dehors est de beaucoup la plus commune. Un fait de cette nature nepouvait avoir sa source que dans un disposition anatomique: mon ami et collegue, M. Gerdy, me semble avoir placé avec raison dans cette du ligament rond. Dans les mouvements d'adduction en effet, ce faisceau fibreux interarticulaire, souleve du fond de la cavite cotyloide la tete du femur, autour de laquelle il tend a se rouler; par ce mecanisme, bientot le sommet de la tete du femur est presque mis sur le niveau du sourcil cotyloidien, et il n'est plus besoin que d'un leger effort musculaire pour que la luxation soit effectuée."

I have again to remark, that nothing of the kind happens, as is described by Messrs Gerdy, Blandin, and Cruveilhier during simple *adduction* of the femur, and that, to produce such or similar effects, *rotation* outwards or inwards must first be made. This I shall endeavour to explain more fully, appealing to direct experiment, towards the conclusion of this memoir.

The last opinion I shall allude to is that contained in a very excellent and popular physiological work. The study of the hip-joint, observes, Mr Mayo, (5th edit. p. 343.) is not less interesting. "There are two points in its construction that have particularly struck me; these are, the provisions to limit rotation inwards and outwards. The rotation of the femur outwards is limited by the strong anterior fasciculi of the capsular membrane. It is very necessary that such a provision should exist, or dislocation inwards of the hip would frequently occur. It is equally necessary that the rotatory motion of the femur inwards, beyond certain limits, should be prevented; if it were not, dislocation of the hip outwards would frequently occur. But this necessary check or limit could not be obtained in the same manner as the first, without the introduction of a long thick incommodious fold of ligamentous membrane behind the neck of the bone. This means nature does not adopt, but in its place introduces within the joint a ligament called the round ligament, which is of a length exactly to stop the rotatory motion inwards, when its further production would endanger the joint. But a ligament in the interior of a joint on which so much pressure is made as on that of the hip, would be liable, without some special provision, to become diseased through the pressure; to prevent this result, there is a notch cut at the bottom of the joint, in which a bed of fat is laid, and which exactly corresponds in length with the ligament, and keeps it always out of harm's way."

My own observations do not quite accord with those of Mr Mayo; but it is evident that Mr Mayo was fully aware of that very important fact in the history of the joint, viz. the necessity for some contrivance *to check rotation* of the femur,—a circumstance which seems to have escaped the notice of, I will not say all, but most of his and my own contemporaries and predecessors.

1. When the articulated skeleton, cleared of all its soft parts, with the femur connected to the acetabulum by a single strong wire or swivel, is examined with reference to the question of "movements at the hip-joint," we find that flexion, extension, and adduction may be performed with the femur almost to any extent; at least, the thigh-bones may be brought inwards in adduction till they quite cross each other without any occasion for the head of the femur quitting its socket. But not so with abduction, for if this be carried very far in the adult, so as to elevate the limb much beyond a right angle with the trunk, then the great trochanter encounters the edge of the acetabulum, and checks the further progress of the limb in this direction. It is not necessary to say much with respect to the motions of rotation inwards and outwards in the articulated skeleton; the extent of these motions will depend on the flexibility of the articulating wire; it is sufficient, therefore, to observe that there exists no *osseous* contrivance to check rotation in either direction, and to any extent. Are the motions, then, of the femur *universal* in the

strict sense of the term, even when attempted to be applied to the mere bones artificially articulated? I should say not: the motion of *abduction* has an osseous check, varying at different ages; the differences depending on the greater or less obliquity of the neck of the femur.

2. I shall now examine into what motions may be performed by the same joint when clothed with all its soft parts, untouched and undissected, requesting the reader to be careful in remarking *that, unless the contrary be expressed*, the motions of extension, flexion, abduction, and adduction, are uniformly spoken of without any reference to *rotation* either inwards or outwards; a want of attention to this seems to have led to the theories of Gerdy, Blandin, and Cruveilhier, which, so far as my knowledge goes, I believe to be incorrect.

*Flexion* may be pushed to almost any extent; *abduction* just so far as the osseous check and the stretching of the *gracilis* and *adductor longus* will admit of; *adduction* until the limbs completely cross each other, the checks to *this motion* being, 1*st*, the opposing thighs, and 2*d*, the capsular ligament; 3*d*, in very thin persons, the stretching of certain of the capsular muscles. *Extension*, as was proved by Scarpa, is totally impracticable *beyond the plane of the trunk*, so that, in some measure, there is no such motion as *extension* of the thigh upon the pelvis. It is quite a deception to suppose so, caused probably by the elasticity of the lumbar intervertebral cartilages. *Lastly*, rotation, which is either *outwards* or inwards, can be carried only to the extent allowed of by the *round ligament* of the femur. All attempts, therefore, to combine, to any great extent, the *element* of *rotation* with the other movements of which the joint is capable, receive a complete *check* from the presence of the *round ligament;* and more especially, the *motion of adduction*, which cannot be performed at all when the limb is *at the same time rotated outwards* or *inwards.*

Flexion inwards and upwards, combined with rotation, is also in an especial manner checked by the presence of the round ligament.

Although these be, in fact, the conclusions arrived at, it may not be altogether uninteresting to detail a few of the experiments and observations made to determine these; they have been very frequently repeated, and with every possible care.

Divide with a saw the *os innominatum* vertically through the body of the pubes and inner portion of the tuberosity of the ispion, and in such a manner as to lay open the cavity of the joint, by removing a small portion of the capsular ligament sufficiently to display the round ligament *in situ*; next rotate the femur outwards and inwards; also endeavour to *adduct* the femur so rotated, when it will become manifest that this compound motion cannot be carried to any length without rupturing the ligament, or at least putting on it a strain proportional to the force employed. If this motion be carried further, the head of the bone attempts to leave the socket, and will leave it altogether, provided the capsular ligament be cut away. A frequent examination of these interesting appearances seemed to me to explain much that is still obscure in the mechanism of dislocations of the joint. The functions of the ligament just described are altogether independent of the presence of the capsular ligament, which may easily be proved by cutting the latter entirely away. Again; the person being laid horizontally, and the limbs extended in the same horizontal plane, on turning the toes fully outwards, it will be found that even the feet, much less the thighs, can scarcely be so adducted as to cross each other; nor can the knees be brought inwards beyond the mesial plane of the body; and if an attempt be made in this particular position of the limb to bend the femur upwards and inwards, a *check* will be found to exist sufficiently strong to prevent this motion altogether. Now, this check I found some years ago to be the *round ligament* of the femur, which, so long as the toes are turned outwards, whether the knee be bent or not, prevents, 1*st*, the adduction of the limb to any great extent, and *2dly*, all flexion upwards and inwards, or even directly upwards, except in a very moderate degree. On the other hand, the toes may be turned outwards, and the limbs abducted to a great extent; in fact, until the motion be checked by the *adductor longus* and *gracilis*, and other adductors giving their aid, although less sensibly felt under the integuments.

If we now remove every muscle from over the capsular ligament except the *obturator externus*, the capsular ligament being left entire, we find, 1*st*, that the limb cannot be elongated by a force equal to a single man's power, and that, therefore, the head of the bone does not quit its contact with the cartilaginous surfaces of the acetabulum, notwithstanding the laxity of the capsular ligament. On the other hand, the abduction can be carried to a greater extent than when all the muscles are present, so long as the toes are kept straight forward; but a slight rotation of the toes inwards checks it immediately. Now the rotation of the toes outwards cannot be carried farther than it was before, neither can adduction or flexion of the femur upwards and inwards be carried farther than when all the soft parts were present.

If we now make a small opening through both capsules in front, so as to admit the air, not the slightest *elongation* takes place when the same force is applied to the limb, although we should fully expect this to happen were Weber's theories correct. On dividing the capsular ligament upwards and outwards, so as to cut the reflected ligament of Schmucker, the head of the femur quitted the socket directly, the limb became slightly elongated, but the toes could not be turned out more than they were before, nor could they be so, without rupturing the round ligament. On trying the movements of the limb after this section of the capsular ligament implicating the anterior and inner half of the capsular ligament, it was found that the head of the bone could be drawn partially out of the socket, so as to lengthen the limb nearly to the extent of an inch. The further extension of the limb in this direction was evidently checked by the uncut portion of the capsular ligament, the round ligament evidently remaining quite loose, and not interfering with the dislocation of the limb downwards, but becoming immediately tense whenever the toes were rotated outwards, whether the limb be dislocated or not. On completing the section of the capsular ligament, the femur could be made to quit the acetabulum entirely to a great extent downwards ; in fact, till checked by the round ligament itself. Yet, even here, the round ligament offered the same check to the further extension of the toes outwards. When an attempt is made to carry the head of the femur in any other direction it was found, after cutting the *obturator externus*, that, with the exception of forwards and inwards, directly downwards, and downwards and a little inwards, the round ligament offered a complete check to dislocation of the limb in any other direction ; but it was now found, that, provided the toes were not rotated outwards, the limb could be turned fairly round almost circularly, so that motions in all directions could be performed unchecked by the round ligament, so long as the head of the bone was kept in its socket, with the exception always of the rotation of the toes outwards, which could not be carried beyond a certain limit; and with the toes in this position, the limb could be no more adducted or the thigh flexed upwards and inwards, a single hair-breadth further than when all the soft parts were present, reducing the function of the round ligament to the following expression ; a check ligament to the rotation of the femur, simple or combined, with other motions.

Of rotation inwards, I may further remark, that, if the toes be turned inwards, whilst the limb is extended, the thigh cannot be abducted to the same extent as in rotation outwards; but adduction and flexion of the femur, with adduction both inwards simply and inward and upwards, may be performed with much greater extent than in rotation of the femur outwards ; it is the position of the round ligament of the joint in respect to its insertion into the head of the femur which admits of this. The *obturator externus* muscle is the *first check to the rotation inwards*, to which probably the *psoas* and *iliacus* contribute. After these come the round ligament, or perhaps they may be considered as nearly equal to each other.

On several occasions, the following observations were made. Remove the whole of the capsular ligament, and it will be found that the head of the femur may then be completely dislocated *forwards* *and downwards;* in other words, that the length of the round ligament and its position is such as to allow, without rupture, the head of the femur to leave the socket entirely in the directions of forward and downward, especially towards the *obturator foramen;* at one point it may be found to have quitted the cotyloid cavity to the extent of three-quarters of an inch, without inflicting any injury upon the ligament itself. But if the bone thus hanging attached merely to the *os innominatum* by the round ligament be now carried forwards towards the horizontal ramus of the pubes and its body, and the shaft of the femur be at the same time kept extended in the usual position it hangs in the body, then it will be found that the round ligament will restore the head of the bone so pushed upwards, or upwards and outwards, to its proper place in the acetabulum.

Lastly, a long narrow bistoury being introduced through the capsular ligament, and the *round ligament* divided, with as little injury as possible to the capsular ligament, it was found that *this ligament*, the capsular, checked the motions of the femur, just as effectually as when the round ligament was left intact,—explaining thus the very curious fact, although I have not myself observed it, that the round ligament may be congenitally absent, and the motions of the joint, with all *the checks to these motions*, be found as perfect as if no such deficiency existed.

In conclusion, there remain but a few more points, which I think it necessary to advert to here. They refer to some facts not so immediately connected with the subject of the preceding memoir, as to induce me to introduce them in the body of the memoir.

1. It is by no means improbable that the round ligament of the femur may vary in length in different persons, and that a congenital comparative shortness of this ligament may contribute to the production of the deformity of "*in-toes.*" The measurements of the ligament in a tolerably well-formed female were as follows: 1. posterior and outer surface, 1½ inch; 2. anterior and inner surface, 1 inch; 3. upper margin, 1¼ inch; 4. lower margin, 1⅛th inch; breadth at the acetabulum, 6⁄8ths of an inch; breadth at the femur, 4⁄8ths; thickness at the femur, 2⁄8ths; thickness at the acetabulum somewhat less. On the other hand, it is quite certain that the round ligament of the femur may be congenitally lax, or of a more than usual length in some persons; which laxity may either be confined to itself, or form a part of a general laxity of all the ligaments and fibro-cartilaginous structures throughout the body. One case of this kind I perfectly remember occurred in my practical rooms, Old Surgeon's Hall, a few years ago. A tall and seemingly stout-made woman was brought into the rooms for dissection, and time being allowed by a delayed in-

terment for a careful examination, the hip-joints were found so loose that rotation, and, indeed, all the usual motions, could be performed to an extraordinary extent. During rotation, the hip-joints had precisely the appearance of partially dislocated limbs; in fact, the head of the femur looked as if it had partially left the socket. Similar remarks applied to all the joints of the body, and further dissection showed that the inter-spinal fibro-cartilages partook of the same laxity. The spine, curved like the letter S, presented a series of lateral curvatures, so exactly compensating each other, that the perpendicularity of the spine had, notwithstanding these curves, been perfectly preserved. To this very remarkable case, I hope afterwards to return in a memoir on curvatures of the spine and their causes.

A case of congenital absence of the round ligament, permitting of dislocation of the head of the femur, has been recorded by M. Dupuytren; but in other similar cases of original or congenital luxation, the round ligament was not absent, but very much elongated, flattened superiorly, and, as it were, worn at certain points by the pressure and friction of the head of the femur. Very lately, Mr Stanley brought before the Medico-Chirurgical Society, some very interesting cases of luxation of the ileo-femoral joint, produced by other causes than external violence, and yet not connected with scrofulous ulceration of the hip-joint. A brief report of the cases, and of the discussion thereon, will be found in the Lancet and Medical Gazette for February of the present year. In one case only did an opportunity occur for dissecting the joint, when it was found that the capsular and round ligaments were merely elongated, but that neither of them had given way. I have also been informed by my friend, Mr Dick, of the Veterinary College here, that it is not very unusual to find the round ligament of the femur absent in the horse. He attributes its absence in these cases to rupture from sudden violence short of dislocation; besides the absence of the ligament, other changes go on in the joint subsequent, as he considers, and in some measure, the result of the original accident, viz. atrophy of the cartilages of incrustation, and the conversion of a part, at least, of the abraded surfaces into *the ivory structure*; in short, the very changes I described as occurring in the case which formed the commencement of this memoir.

Lastly, it is worthy of remark, that the fibres composing the round ligament are of unequal lengths, and that in most positions of the femur, the ligament itself is constantly twisted; indeed, it can only be unfolded by a dislocation of the femur downwards, and a subsequent rotation, in so peculiar a direction, as can never happen in the living body.

## ART. VII—*Report of a Committee of the Royal College of Physicians of Edinburgh, appointed to consider the best mode of framing Public Registers of Deaths.* (Approved by the Royal College, February 17th 1841.)

THE proper mode of framing public registers of deaths was pretty fully considered by a Committee of the British Association, which was appointed at the meeting held in this city, in 1834, and reported to the subsequent meeting of the Association in Dublin, in 1835. At that time, the "Act for Registering Births, Deaths, and Marriages in England," was only in contemplation, and it was expected that a similar Act for Scotland would be introduced into Parliament. The English Bill became law in 1837, but the Scottish Bill, in consequence, as is said, of the opposition made to it by the Parish-Clerks throughout the country, has been hitherto postponed. It seems hardly possible, however, that the numerous benefits which our sister-country derives from an effective system of registration, should not, within a reasonable time, be extended to Scotland; and it may be hoped that the recent decided expression of opinion by the Statistical Section of the British Association, respecting the importance of the measure, will contribute to this end.

It is obviously of importance, therefore, that the attention of the Profession in Scotland should be again directed to the subject of the registration of Deaths, and to the advantages, as regards not only the interests of the public, but the progress of medical science, which may be expected to result from a well-regulated system of Registration; and this more particularly, as the plan of keeping such Registers, introduced by the English Bill, (which is considerably different from that previously recommended by the Edinburgh Committee,) and the Statistical Nosology recommended by the Registrar-General, for the use of Practitioners, in filling up the returns of the causes of death, appear to your Committee liable to serious objections.

With two observations, contained in the letter on Statistical Nosology, prefixed to the Table of Diseases drawn up by Mr Farr, and both of which are contained in the Remarks on the Registration of Deaths, that were laid before the British Association by the Sub-Committee formed at Edinburgh in 1834, all must concur.

The *first* of these relates to the importance of retaining the old division of diseases into *Plagues* and *Sporadic Diseases*, or, in other words, into 1*st*, those diseases which are confined to limited districts and limited periods,—which are either endemic or epidemic;—and 2*d*, those which proceed from causes acting pretty uniformly on every large mass of mankind, and which are found accordingly, although influenced by climate and season, to prevail more or less, and to produce a larger or smaller annual mortality in all countries.

This distinction at once recommends itself to the common sense of mankind, and perhaps the most correct scientific account we can give of it is by saying, that one class of diseases is the result of Specific Poisons, of various sorts, introduced into the animal economy, and the other of Morbid Actions, excited by causes which are very generally applied, and are not necessarily deleterious in their effects. But the allocation of individual diseases, in one or other of these great divisions, is attended with difficulty, and the plan adopted in the English Table is in several respects unsatisfactory.

The *second* of the two observations referred to, is that, in Sporadic Diseases, it is generally easier to distinguish the region, or even the organ, primarily and chiefly affected, than to ascertain the precise nature of the disease. The importance of this observation appears to your Committee not to have been sufficiently appreciated in forming the Registration lists of diseases for England; and to suggest the only distinction that ought to be observed between a Statistical Nosology, and a Nosology for the use of Schools of Medicine.

To these we would add only one other preliminary observation, which is the foundation of the criticism to be offered on the Tables of the Causes of Death drawn up by Mr Farr, and used in the Returns under the English Registration Bill, viz.—That in constructing such returns, it is better to *acknowledge ignorance*, than to run the risk of *proclaiming error*,—better to rest satisfied with a smaller amount of information, of which we can be absolutely certain, than to attempt to procure a larger amount, at the risk of the facts being so much blended with opinions, as to make numerical statements a possible source of misapprehension and erroneous doctrine.

It is to be observed, that certain articles of information in regard to all the deaths that occur in a district, may be accurately and uniformly given in the Registers, and be of much importance in various medical inquiries (because enabling us to construct Tables illustrating with certainty the influence of various causes on health,) altogether independently of any medical opinions as to the causes of death; viz. the age, the sex, the precise date of death, the occupation of the deceased person, or that of the head of the family to which he belonged, the precise locality of his residence, the part of the body chiefly affected by the fatal disease, and, in a general way, the duration of his disease. The Report of the Edinburgh Sub-Committee laid some stress on the importance of all Registers containing details on the two last of these heads; and suggested, that all the deaths should be ranked as depending on acute or chronic diseases, according as the patient should have been known to be ill, and disabled for his ordinary occupations for less or more than *six weeks* before death. We regret to perceive no evidence that effectual provision is made in the Registers kept under the Act now in force in England for any of the last mentioned points being uniformly and regularly ascertained.

In proceeding farther, it must always be kept in mind, *first*, That to a very large proportion of the deaths registered, no report of the cause of death, by a medical man, will be annexed; and, *secondly*, That such a report, when given, unless much care be taken, may very often be founded in a great measure on opinion, not on ascertained facts. But, conformably with the principles above laid down, it is desirable that all the cases of sporadic diseases should be entered according to the seat of what was regarded as the chief affection,—as acute or chronic disease of the *head*, of the *chest*, of the *stomach* or *bowels*, (including affections of the liver and other chylopoietic viscera,) of the *urinary organs*, of the *genital organs*, of the *bones* or *joints*, or of *external parts*. This may be done, as was observed by the Committee of the Association, without any report by a medical man; but it will of course be done with more accuracy by medical practitioners. Farther, it would be desirable that the accurate specification of the organ, or the more precise name of the disease, should be given, *only when furnished by a medical practitioner*, and should be stated in a separate column; and that practitioners should be requested to specify the name, only in those cases in which they can announce it with confidence and precision. Thus we might have, *e. g.* 100 cases of death reported as resulting from diseases of the chest, 40 of these marked as acute cases, and of these 40, perhaps only 10 would be named; but the names given, being in conformity to instructions, as simple as possible, issued to all medical men, and to none others, would be understood alike by all, and therefore be deserving of confidence.

Thus we should have in every register of deaths, two distinct columns—the one to be filled up in all cases, the other only in some cases, from which, of course, two lists may be at any time made up, the first illustrating many important points relative to disease, although containing no nosological name; the second affording as good security as the state of medical science and medical instruction permits, that the names of diseases given in it are given uniformly, and applied similarly in all parts of the country. Each of these columns would be subdivided in the way to be afterwards mentioned.

The construction of the List of Diseases, to be recommended, by authority, to all practitioners, is the subject of greatest difficulty connected with the registration of deaths, and that in which the plan adopted in England seems liable to the greatest objection. But we regard it as a fundamental principle, that practitioners should be strongly advised rather to content themselves with stating the seat of the disease causing death, and its course as acute or chronic, than to affix a name to it, without possessing certain evidence, from examination of the body or other unequivocal indications, of the name they affix being the right one.

The importance of this caution appears from the Tables published in England. We do not refer to the whole list of diseases, about 180 in number, given under the name of Statistical Nosology, which seems very deficient in simplicity, (comprising, for example, six distinct names for varieties of the Continued Fever of this country,) but would refer particularly to the Abstract of the causes of death in the registers contained in page 120 of the First Report. The names there given are certainly a great improvement on the ancient Bills of Mortality, but we think it easy to show that the objections justly urged by Mr Farr against the old nomenclature, that "each disease has been denoted by different terms, and each term applied to different diseases, that vague in convenient names have been employed, and complications been registered instead of primary diseases,"—have been by no means uniformly avoided.

The first objection which occurs to us to this "Abstract of the Causes of Death," is, that cholera, (distinguished from the Asiatic or malignant cholera,) croup, diarrhœa, thrush, dysentery, and erysipelas, are all set down among the plagues, *i. e.* the epidemic, endemic, and contagious diseases. We submit, that the three first of these should be excluded from this head of diseases altogether; and this more especially as, besides 1655 cases of croup, ranked among the epidemics, we have, under the head of sporadic diseases, in the same table, 24 from laryngitis, and 289 from quinsy. We apprehend that it would be much simpler, and more scientific, to have all these ranked together, in the first instance, as acute disease of the windpipe, and very much doubt if any advantage is to be derived from more minute distinctions among them.

Again, we have, among the epidemic diseases, 460 deaths from cholera, 2755 from diarrhœa, and 675 from dysentery; and then we have, among the sporadic diseases, 170 from ulceration of the bowels, 3396 from gastro-enteritis, and 853 from disease of the bowels, besides 437 from tabes mesenterica, and 1963 from teething. We think it obvious here, that different names, and even different places in the system, must have been repeatedly given to the same diseases; and that all scientific purposes would have been better served, and with less chance of any erroneous inference, if the whole of these had been classed together as sporadic diseases of the Intestines, acute or chronic, according to their duration; and if more specific names had been given only to a small proportion of them, under the caution already stated, that such names should be given only in those cases where practitioners are certain of their being rightly applied.

In regard to aphthæ, dysentery, and erysipelas, we consider these diseases as being, in the greater number of instances which occur in this country, distinctly sporadic; and although we agree to the propriety of ranking some cases of each of these diseases among epidemic or contagious diseases, yet we think this should only be done, and that practitioners should be warned only to do it, when successions of cases have occurred within such narrow limits, both of space and time, as clearly to indicate the operation of some local and temporary cause; and in this case the term epidemic should be prefixed to the name of the disease. With this caution, we cannot doubt that the epidemic peritonitis, or puerperal fever, must likewise be occasionally added to this class of diseases.

Another important observation with regard to epidemic diseases is, that practitioners should be warned not to apply the terms fever or typhus, without prefixing, and being satisfied of the right application of, the term contagious or epidemic; because it is certain that at present the name fever is given to many febrile diseases, particularly of children, which are quite distinct from the continued fever, justly ranked as the most important of the epidemic diseases of this country.

Thus the first class of diseases—the epidemic, endemic, and contagious, will be reduced, except on occasion of uncommon epidemics, to the following, which all admit to be strictly of this character,—epidemic, influenza, small-pox, measles, scarlatina, hooping-cough, epidemic continued fever, intermittent fever, syphilis, and hydrophobia.

The first group of sporadic diseases in the English Register consists of those of the nervous system, and the number of deaths in six months referred to this head is 21,873, of which only 764 are marked simply as disease of the nervous system: all the rest have names assigned to them, and no fewer than 10,729 are named convulsion, besides which there is a separate head of epilepsy, comprising 570, and 4591 are recorded as cephalitis and hydrocephalus. It is obvious here, as, indeed, Mr Farr has stated, that cases of various "undeveloped diseases, and the *results* of different diseases," many of these truly of the epidemic class, have been ranked as convulsions. If it were an instruction to medical men to avoid entering simply as convulsions, those cases which occur as a symptom or sequela of other diseases, thie fallacious item in this great family of diseases would be rapidly diminished.

Instead of making separate heads of cephalitis and hydrocephalus, (the distinction between which will certainly not be understood alike by all practitioners,) we would greatly prefer using the general term inflammation of the brain or its membranes; observing, of course, the usual division of cases into acute and chronic, and making a separate entry of those cases which practitioners can accurately distinguish (by dissection,) as inflammation of the membranes, inflammatory softening of the brain, or acute hydrocephalus;—to which should be added a record of those cases, whether acute or chronic, which can be distinguished as of a scrofulous or strumous character—of which, of course, the best characteristic is the existence (ascertained in like manner) of tubercular deposits.

In regard to apoplexy and palsy, it is obvious that, in a pathological view, the distinction of these from one another, is not nearly so important as the distinction of either the one or the other, according as it has been produced by inflammation, or by rupture of a vessel, or by organic disease, or independently of any of these. These distinctions may easily be marked by practitioners, and the record of them will be useful, provided only that they have been ascertained beyond doubt by the appearances after death.

Thus, the general distinction, and the only one uniformly observed under this head, will be into acute and chronic diseases of the brain, spinal cord, and nerves; and under each head we shall have a certain number of cases accurately distinguished, as inflammation, simple or scrofulous, apoplexy or palsy from inflammation or softening, from effused blood, from organic disease, or without obvious cause. Among the acute diseases we shall have idiopathic convulsions; among the chronic, habitual epilepsy, a certain number of cases of which, dependent on organic disease, will also be marked. The remaining diseases of this class contained in the abstract, and to be distinguished by practitioners, tetanus, chorea, insanity, and delirium tremens, demand no comment.

The diseases of the heart and lungs are so often combined, and it is often so difficult even for a medical man to point out the part primarily and chiefly diseased, that we are convinced the attempt to separate them in all cases, in statistical tables, can lead to no result on which reliance can be placed. We would therefore recommend that there should be no other general distinction of these diseases, than that into acute and chronic diseases of the chest, and the names of pectoral diseases, which seem proper for the guidance of practitioners in the more accurate specification, under those two general heads, are the following:—

Inflammation of the Larynx or Trachea.
Bronchitis.
Bronchitis with Asthma.
Pneumonia.
Pleurisy with large fluid effusion, (*i. e.* Empyema.)
Consumption of the Lungs, (Tubercular.)
Other organic disease of the Lungs.
Organic disease of the Lungs with Dropsy.
Inflammation of the Heart,
Organic disease of the Heart.
Organic disease of the Heart with Dropsy.
Thoracic Aneurism.

The greatest difficulty respecting these diseases is, how to place those cases to which practitioners will be apt to give the vague names of Asthma and Hydrothorax. The former is probably always an attendant, although in certain constitutions only, on Bronchitis, and seems to be almost always the cause of Emphysema of the Lungs; and even when this last affection has become complicated, as in the natural course of things is very often the case, with Hypertrophy of the right side of the Heart, Enlarged Liver, and Dropsy, still the part *primarily* affected may be said to be the Bronchia. But the best mode of registering such complex cases will be considered presently.

It is obvious that Dropsies ought to be distinguished by the seat of the disease producing them, not by their own seat, and therefore that the proper distinction of cases terminating in this way is into Dropsy from diseased Lungs, from diseased Heart, from diseased Liver, from diseased Kidney, and from diseased Ovary, perhaps we might add, from diseased Pleura, and from diseased Peritoneum. It is certain, that, in a majority of Dropsical cases, organic disease of more than one internal part exists, and is concerned in producing the effusion; still we are anxious to point out the importance of observing, as carefully as possible, the organ primarily and chiefly diseased, (*e. g.* whether it is the Heart or the Lungs that has first and chiefly suffered) before registering the disease.

The List of Diseases of the Intestinal Canal, and the numbers reported of deaths as produced by them during the first six months of registration in England, are as follow:—

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| Teething, | 1903 |
| Gastro-Enteritis, | 3396 |
| Peritonitis, . | 82 |
| Tabes Mesenterica, . . | 487 |
| Ascites, . . . | 51 |
| Ulceration, . . . | 170 |
| Hernia, . . . | 252 |
| Colic, . . . | 58 |
| Constipation, . . . | 461 |
| Worms, . . . | 264 |
| Disease of Intestines, . . . | 853 |

in addition to above 3800 deaths by Diarrhœa, Dysentery, and Cholera, placed among the Plagues.

With regard to this table, we do not think it is going too far to observe, that it would have answered all scientific purposes much better, to have classed the whole of the cases referred to it, with the ages of the patients, simply as acute or chronic diseases of the Stomach and Bowels; all the attempts made in it to give them more specific names being at least as much calculated to mislead as to instruct. Thus, the two first and largest items in the enumeration ought to be struck out altogether, for Teething, although often a cause of fatal disease, is not properly styled a cause of death;* and what is properly meant by Gastro-Enteritis, as distinguished on the one hand from continued Fever, and on the other, from Peritonitis, Diarrhœa, Dysentery, and Ulceration of the Bowels, we must profess ourselves quite unable to understand.

It would, it is conceived, be much better, ranking all these cases under the general heads of Acute and Chronic diseases of the Alimentary Canal, to direct the attention of practitioners to the following more particular names, to be given only to those cases to which they are sure of their being truly applicable:—

Peritonitis.
Inflammation of Mucous Membrane of Intestines, (with its Sequelæ.)
Dysentery.
Idiopathic Diarrhœa.
Cholera.
Scrofulous or Tubercular Disease of the Intestines or Glands.
Other Organic Disease of the Stomach or Intestines.
Do. with Dropsy.
Hernia.
Obstruction of Bowels (*i.e.* without Inflammation or Organic Disease.)

In regard to the list of diseases of the Liver, under the distinction of acute and chronic, there should be a distinct head of Inflammation, (and its sequelæ,) one of granular disease, (or Cirrhosis), one of other organic disease, and one of Jaundice without organic disease. We would register Dropsy along with the different heads of chronic disease of the liver, when it is present, but would annex a caution that, when organic disease of the Liver is found in connexion with organic disease of the Heart or Lungs, it should not in general be regarded as the primary or most essential disease. Thus, many of the cases in which Dropsy is combined with Liver disease, would be referred to the original and fundamental change of structure within the Chest, on which both are in fact dependent.

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* The same observation applies to Worms.

We regard Mr Farr's abstract as an improvement on the general table recommended by the Sub-Committee of the British Association, in so far as it makes separate heads of diseases of the Urinary organs, and of the organs of Reproduction, distinct from those of the abdominal viscera, because most of the diseases of these two sets of organs may be referred to their place in Nosology, even by those who have had no medical instruction.

But there is considerable difficulty as to the arrangement of those numerous cases of dropsy, which are now known to depend in part, and often most essentially, on Granular disease of the Kidneys. That the importance of this disease is altogether overlooked in the returns made in England, and, indeed, that the classification of dropsical diseases is quite unsatisfactory, appears from this, that while 995 deaths (occurring in the last six months of 1837) are ascribed to Hydrothorax, and only 51 to Ascites, we have 5584 ascribed to Dropsy of uncertain seat, and only 3 to granular disease of the Kidneys; but how this confusion and ambiguity are to be corrected, is a more difficult question. We would suggest that practitioners should be advised to set down, as cases of Granular disease of the Kidneys, all cases in which the urine is permanently of low specific gravity, and coagulable by heat and acids; and then, that cases of this description, as attended by Dropsy, by Coma, or by Diarrhœa, which seem to be the most usual modes of fatal termination of this disease, should be farther distinguished. There will, of course, be a number of cases of dropsy dependent on granular kidney, which will not be included under this head, their nature not having been determined by practitioners. These will appear as Dropsies of uncertain seat, or as diseases of the Head or of the Bowels; but as this disease of the Kidneys does not make itself known by any symptoms manifestly referable to the urinary organs, it seems impossible to have a record of its frequency extending even to all the cases which are reported by practitioners.

We think there can be no doubt as to the propriety of removing Diabetes from this head of the Nosology, and classing it among diseases of uncertain seat; and likewise, that the general term Ischuria, should not appear in the list of diseases reported by medical men, but that cases of that kind should be reported as diseases either of the Kidneys, Bladder, Prostate gland, or Urethra.

In regard to the diseases of the organs of Reproduction, included in Mr Farr's list, we have only to observe, that the fact of the deaths of females from diseases of this class, independently of parturition, being only 150 in 148,700 deaths, is sufficient evidence that many of the deaths which should have been ranked here, if they had been correctly understood, have been ascribed to other causes.

We think the classes of diseases of the organs of Locomotion, and of the Integumentary system, may be most simply designated as diseases of the Bones and Joints, and of external parts, and that several of the diseases stated as of uncertain seat, should be ranked here. It seems quite incorrect to enumerate, as of this last class, cases of Inflammation, of Hæmorrhage, of Abscess, of Mortification, of Scrofula, Carcinoma, or Tumour; the seat of every case of which must be known, if the disease is truly recognized.

After the head of Abscess, that of Ulcer, and that of diseases of the Joints, there should be another head entitled Scrofulous Do., and by means of this and of the names already suggested, Scrofulous diseases of the Brain, Lungs, and Abdominal viscera, we shall have a fair view of the extent of the mortality from Scrofulous diseases, as compared with that portion of the whole mortality on which there are accurate reports.

Perhaps the only diseases which ought to be ranked as of uncertain seat, should be Gout,—Dropsy, when the cause is obscure,—Diabetes, Scurvy, Purpura, and Debility from unknown cause.

Thus, the list of Sporadic Diseases, according to which we should wish those cases, to which any specific names are given, to be arranged, would stand thus :—

Inflammation (acute or chronic) of the Brain.
    Do. with Scrofula.
    Do. of Spinal Cord.
Apoplexy or Palsy (acute or chronic) from effused blood.
    Do. from Inflammation or Softening.
    Do. from Organic Disease.
Simple Apoplexy.
Idiopathic Convulsions.
Epilepsy,
Chorea.
Tetanus.
Insanity.
Delirium Tremens.
Neuralgia.
Inflammation (acute or chronic) of Larynx or Trachea.
    Do. of Mouth, Tongue, or Fauces.
Acute Gangrene of Do.
Cancer of Do.
Bronchitis.
Bronchitis with Asthma.
Pneumonia.
Pleurisy with large fluid effusion, (or Empyema.)
Consumption of the Lungs (tubercular.)
Organic Disease of the Lungs, not tubercular.
    Do. with Dropsy.
Inflammation of Heart.
    Do. from Rheumatism.
Organic disease of Heart or great vessels.
    Do. with Dropsy.
Peritonitis.
Inflammation of Mucous Membrane of Bowels.
Dysentery.
Diarrhœa (Idiopathic.)

Cholera.
Obstruction of Bowels.
Tubercular disease of Intestines or Glands.
Organic disease (not tubercular) of Stomach or Intestines.
Do. with Dropsy.
Hernia.
Inflammation of Liver.
Granular disease of Liver (or Cirrhosis.)
Do. with Dropsy.
Other organic disease of Liver.
Do. with Dropsy.
Jaundice (without organic disease.)
Organic disease of Pancreas or Spleen.
Inflammation of Kidneys.
Granular disease of Kidneys, with Dropsy.
Do. with Coma.
Do. with Diarrhœa.
Urinary Calculus.
Ischuria Renalis.
Inflammation of the Bladder.
Organic disease of Bladder.
Do. of Prostate Gland.
Do. of Urethra.
Do. of Testis.
Inflammation of Uterus.
Cancer of Uterus.
Other organic disease of Uterus.
Do. of Ovary.
Cancer of external parts.
Inflammation (acute or chronic) of the surface of the Body, (including Abscess, Ulcers, Erysipelas, Carbuncle, Chronic Cutaneous diseases.)
Do. with Scrofula.
Inflammation of Joints or Bones.
Scrofulous disease of Joints or Bones.
Other organic disease of Do.
Gout.
Dropsy from uncertain cause.
Diabetes.
Hæmorrhage from uncertain cause, (seat to be stated.)
Scurvy.
Purpura.
Debility (including deaths from old age.)

But when we consider the very large proportion of fatal cases in which a complication of diseases exists, and the importance of recording as much as possible of the causes tending to the fatal event, we are decidedly of opinion, that it is impossible to obtain the whole pathological information which such registers, in so far as they are filled up by practitioners, ought to convey, without a subdivision of the column assigned for the name of disease into two compartments, the one stating the "Disease causing Death," the other the "Previously existing Disease, if any." It is true, that different practitioners may arrange the information conveyed in those two columns differently; but as both columns will always be examined by any one wishing to obtain statistical information from them, this is of little importance.

The advantages of the plan which we propose for the keeping of these registers will be best shown by the following schedule and examples:—

| Date. | Name. | Sex. | Age | Married or Single. | Exact Residence. | Employment, or that of Head of Family. | Duration and Seat of Disease. | | Name of Disease | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | Acute. | Chronic | *Causing Death. | Previously existing, if any. |
| May 10 | Jas. More | M. | 27 | Single | 12, Potterrow | Tailor | Bowels | — | Dysentery | — |
| May 11 | Ann. Jones | F. | 40 | Married | 159, Cowgate | Husb. Blacksmith | — | Chest | Consumption | — |
| May 15 | John Brown | M. | 50 | M. | 220, High St. | Labourer | Chest | — | Pleurisy | Epidem. Fever. |
| May 16 | Mary White | F. | 5 | S. | 30, George St. | Father Shopkeeper | Head & Chest | — | Convulsion | Hoop. Cough. |
| May 17 | Jean Smith | F. | 60 | M. | 5, Rose St. | Shopkeeper | — | Chest | Dropsy | Organ. dis. of Heart and Liv. |
| May 18 | Wm. Reid | M. | 43 | M. | 80, Grassmarket | Porter | Bowels | — | — | — |
| May 19 | Margt. Forbes | F. | 50 | S. | 20, Canongate | Washerwoman | — | Bowels | Diarrhœa | Gran. dis. of Kid. |
| May 20 | John Tod | M. | 4 | S. | 30, High St. | Father, Writer | Head | — | Inflammat. of Brain (Scrofs.) | — |
| May 21 | Mary Hay | F. | 3 | S. | 2, Rose St. | Father, Servant | — | Chest | — | — |
| May 22 | Jas. Bell | M. | 65 | M. | 2, George St. | Servant | Head | — | — | — |

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* The columns containing names of diseases, only to be filled up by medical practitioners, except in cases of death from notoriously epidemic diseases such as small-pox or hooping-cough.

The only other observation which occurs to us on this subject is, that the Tables of mortality abstracted from the Register may easily be made to exhibit the differences of health of towns and districts of the country, more satisfactorily than those published in England. The importance of the data thus afforded is very well stated by Mr Lister, in his First Report, as follows:—

"I have felt that it was of great importance, not only to give an abstract for the whole kingdom of England and Wales, but to exhibit the difference that prevails in different portions of the kingdom, to compare town with country, agricultural districts with manufacturing and mining districts, the hilly with the low and level, the maritime with the inland, the eastern and northern with the western and southern parts. Nor are these diversities matters of merely curious speculation, but may be made the source of important benefits especially to the poorer classes. It was stated in evidence before the Committee on Parochial Registration in 1833, by the Actuary of the National Debt Office, that the extent of difference which then existed was utterly unknown; that tables for the use of the poor in reference to sickness and mortality, and in reference to the regulation of their Friendly Societies, could not then be constructed for two districts differing in character, from the want of such information as an improved system would afford; and that if two societies of poor men, residing in districts of a totally different character, were, at the same time, to apply to him for tables to guide them in preserving their societies solvent, he "should be under the necessity of giving the same tables to both, though knowing perfectly that the rates which were adequate in one case, were inadequate in the other." It was also stated to the Committee on Laws respecting Friendly Societies by another eminent Actuary (Mr Milne), that no one table or scale of contributions can, with propriety, be adopted by all Friendly Societies; that one composed of members living in or near a manufacturing town, required a table very different from that which would be required in places where the population is less dense, and where a considerable proportion of the members are chiefly employed in the open air; but that these are differences which he could not "pretend to estimate for want of *data*." The useful principle of comparison may, if requisite, be carried out into a more minute system of subdivision than I have, in this first instance, deemed it necessary to adopt. But there was danger lest, in attempting a more subtle discrimination, we should lose sight of broad distinctions which it was important to observe; and it was necessary to remember, that to diminish by subdivision the number of facts on which calculation could be brought to bear, was materially to diminish their value. The extent to which division should be carried, is a question not to be decided by any established rule, and which necessarily admits of much diversity of opinion; and I have endeavoured (not unaided by judgments which I respect) to pursue a middle course between the opposite extremes of subdivision and condensation, dividing the kingdom into the twenty-five portions in which are exhibited abstracts of deaths at different ages."

According to the division thus adopted by Mr Lister, the five largest towns in England, London, Manchester, Liverpool, Leeds, and Birmingham, are separated from the adjoining districts of country, and the mortality in each exhibited separately; but all the second-rate towns in England are united with the surrounding districts of country, and constitute but a small part of the population of the districts (containing from 200,000 to above 1,000,000 inhabitants) of which the mortality is given.

The deficiency of the information given by these tables, appears distinctly from attempting to compare the mortality in Edinburgh, with that in any of the English towns. All the towns of which tables are given, separately from country districts, are commercial and manufacturing towns, and, therefore, not proper objects of comparison with Edinburgh. The English towns which resemble Edinburgh most, in the condition and occupations of their inhabitants, are Bath, Oxford, Cambridge, and some of the Cathedral towns; but we have no record of the mortality of any of these, disjoined from large districts of surrounding country.

In Scotland there are only 17 towns, of which the population exceeds 10,000; and in order to have a fair exposition of the effects of town life, and of the mode of life in different towns, as compared with country districts, it would be of great importance that the mortality in all these should be stated separately from any country districts.

If these observations on the best plan for keeping Public Registers of Deaths shall be approved by the Royal College, we would suggest that they should be made known, along with the earnest recommendation of the general principle of the measure by the Royal College, in whatever quarters may be thought advisable, in the view of aiding the object of obtaining a Registration Act for Scotland.

W. P. ALISON,
*Convener of Committee.*

## ART. VIII.—*Practical Observations on the Diseases of Peru, described as they occur on the Coast and in the Sierra.* By ARCHIBALD SMITH, M. D. (Continued from Vol. liv. p. 381.)

### I.—DISEASES OF THE COAST CONTINUED.

*Dysentery.*—The nature of this disease, as it commonly occurs in Lima, where it may be said to be endemic, I shall endeavour to illustrate by a few remarks and examples,—arranging these under two general heads, viz. Simple and Complicated Dysentery.

The former embraces those cases in which the local irritation or inflammation, situated in the course of the great intestine, appears to constitute the primary and principal disease; the latter includes those cases of dysentery which obviously coexist with some other disease, or such cases as are dependent on, or complicated with, a morbid condition of the liver, either in structure or function.

*Simple Dysentery.*—The simplest form of dysentery in Lima is that which is known by the name of " Pujos blancos," or an urgent call to go to stool, while nothing is voided but white mucous matter. Here we have little or no fever, and no pain in the belly on pressure; the tongue is sometimes quite clean ; but at other times, it is foul, especially when the disease has lasted some days, and the pulse begins to rise.

This attack may come on suddenly from sleeping too lightly covered and exposed to a cold damp night air, or to a current from an open door; or it may have been preceded for several days by a sense of heaviness at the region of the stomach, which I have known induce a person so affected to visit the French hotel or Italian coffee-house, and there call for some nice dish to whet his impaired appetite, of which the consequence next day was tenesmus and white mucous dejections.

This sort of disease may be relieved by a purgative clyster followed by a sudorific, or a dose of syrup of morphia. I have seen it more than once removed by an emetic, which produced smart catharsis, and was followed by a curative sweat, favoured by diluents, and the warmth of bed-clothes. And here, by the way, it may be remarked, that the routine practice in Lima, of giving emetics in almost every case of dysentery, for three successive mornings after bleeding and purging, &c. have been premised, is highly objectionable in those instances where the liver appears to be the organ primarily and principally affected with increased sensibility or inflammation; as in many cases of complicated dysentery. But to return;—should the attack of simple dysentery, such as I have just described, be not speedily removed, it may assume a more serious form, and come under other treatment, as in the following example.

A young man continued to walk about the porticos of the great square to a late hour at night, and felt chilled before he left it. He retired to his quarters, went to bed, and next morning found himself troubled with tenesmus. Two or three days after he asked medical advice. I now saw him with some uneasiness at the hypogastrium, a soft skin, the tongue perfectly clean and moist, and of natural aspect; the pulse about 80°, full and soft; there was a good deal of tenesmus, and the scanty dejections were in appearance like white jelly, streaked with blood. He had taken no remedy before I was called to see him. I gave him a dose of castor oil, which afforded but little relief, and the ineffectual calls to ease the belly returned as before. He was then ordered five grains of extract of lettuce, and four grains of calomel every four hours, for a dose, and after it a glassful of linseed tea; and his diet was thin arrow-root. By this means constriction was removed, the bowels were opened, and gentle diaphoresis induced. After five or six doses of the calomel and extract of lettuce were taken, a dose of castor oil was given with excellent effect, and it dislodged freely the contents of the bowels. No salivation supervened; and, by a few more days of restricted diet and care, health was completely restored.

A stout young gentleman from Europe, and not long resident in Lima, went to the Plaza on a warm morning, and took a glass of cold water; he then came home to breakfast, and, an hour after he had finished it, he felt wandering griping pains in the bowels; but these did not deter him from making a hearty meal at dinner. The griping pains became more frequent and molesting, and a few hours after dinner the pain became fixed in the lower belly. He took a dose of castor oil; and then went to walk in the streets and Plaza, thinking to shake off his indisposition by bodily exertion. He returned home at a late hour; laid himself down to sleep; passed an exceedingly bad night, with feverish heat, restlessness, headach, and a necessity to turn out of bed more than a dozen of times.

I saw him next morning, when his pulse was full and frequent, or about 90°; and he said that he was more serene at that time than he had been some hours before; for that the fever had subsided much, though he had no regular sweat, which he believed to have been checked by the frequent necessity of obeying the call of scanty and painful ejections. His tongue was white and dirty, the face flushed, and the pain in bowels distressing, with his mind anxious and disturbed.

His motions were now observed to be much tinged with blood. A nurse, who was ordered to attend him closely, applied an emollient cataplasm to the abdomen, and administered to him an emollient enema, with a view to moderate the tenesmus; and it returned charged with coagulated blood. He was then bled at the arm, and immediately after he took eighteen grains of calomel, mixed in a little gum Arabic and simple syrup. This dose quieted the tormina for a time, and soon after he voided two or three thick and spinage-like stools; and he again took smaller and repeated doses of calomel conjoined with opium, at proper intervals, till, on the third day from this attack, the gums began to be a little red and altered from their ordinary appearance, and therefore the calomel was suspended; and the patient was left to pass a day on diluents sweetened with syrup of ipecacuanha. By this means diaphoresis was promoted, and further time allowed for the absorption of the mercury, which was only beginning to develope its effects. Perspiration went and came occasionally, and partially, the tongue was yet foul, and the pulse down at 80. A purgative was administered with good effect; so that, having ceased to operate, the patient slept and perspired very freely in the course of the night. On the morning after (being the fifth day of the complaint) the bowels were thus efficiently moved, the patient for the first time complained of his mouth, and on inspection, the gums were seen to be red, well injected with blood, full and tender, and the palate looked risen, corrugated, and somewhat blistered; but no ptyalism was present, though the mouth and tongue were humid. The tenesmus disappeared; the urine continued to be a little too highly coloured; but no pain or uneasiness on pressure remained in the abdomen. He now perspired continually, and the pulse became soft, and of natural frequency, His spirits grew buoyant; he felt well, and if permitted, would have risen and dressed himself. He used arrow-root diet, as he did from the commencement, and drank linseed tea as often as he liked.

On the sixth day from the invasion, he voided, without the aid of opening medicine, a perfectly natural looking deposition; and from this date his convalescence was rapid, and his hunger so craving, that he was importunate for better and more plentiful diet than could be prudently allowed till some days more had elapsed, when he went on a visit to the country. He soon returned to his counting-house in good and vigorous health.

A yet more common form of simple dysentery than either of the preceding is, when the pulse becomes febrile, though not very much so; when the tongue is dirty, though moist; the griping and tenesmus troublesome, but not excessive, with little or no tenderness in the abdomen; the motions scanty, and consisting chiefly of mucous and bloody matter, more or less intimately mingled together, in varying proportions.

The practice which I found invariably successful in such cases, which are of frequent occurrence, was at the first visit to order a suitable purgative, such as the infusion of senna, with the addition of manna and rhubarb, or a dose of castor oil. The purgative usually carried off a portion of green or yellow liquid discharge, but seldom any considerable portion of feculent matter, and the stools came away, for the most part, as if they had been strained or filtered through the contracted part of the intestine. After the action of the purgative, there were given night and morning, five grains of calomel, with one grain, or one half-grain of opium, combined in form of pill; but every other morning this remedy was not given till the intestines had been previously acted upon by a suitable clyster or mild purgative. On the fourth or fifth day of this treatment, the gums were affected, and then feces, commonly of a dark colour, and offensive in odour, were voided, and not rarely several black gelatinous-like stools came away. These jellied motions were always, when they appeared, viewed as favourable indications of the mercurial action, and of returning health. The secretions now became improved, and the perspiration free; the tongue gradually got clean; the appetite was good; the powers of digestion grew vigorous; the motions assumed a natural appearance, and the patient did well and soon recovered. The soldier in hospital, when thus treated, was usually returned fit for duty, in less than twenty days from the time of his admission.

I feel gratified in being able to say that my friend, Dr Maclean, who succeeded me in the charge of British and American seamen and subjects in the hospital of San Andres, Lima, assured me, just before my departure from that city, that, during the few weeks he had been attending at the request of the director of the Public Beneficencia, some of the Indian soldiers in the medical wards of this hospital, he treated not less than fifteen or sixteen cases of dysentery without having once had occasion to use the lancet ; that he cured all of them with calomel ; that it was quite extraordinary how certain the remedy proved ; for that no sooner was the mouth gently touched with the mercury than the secretions improved, gentle perspiration was induced, and health followed.

Though I have always observed that a warm and general diaphoresis, or a more profuse sweat, proved a salutary process, resulting from mercurialization in dysentery, yet I do not believe that the salutary effects of the mercury depended on its sudorific powers alone, (because simple sudorifics have not the same curative efficacy,) nor yet upon the revulsion which it occasions through the salivary organs, because, in general, ptyalism, either not at all, or only in a very moderate degree, was found essential to the production of the salutary change induced by mercurialization. In well established and developed forms of dysentery, sudorifics may be useful auxiliaries, and the soothing combination of calomel with opium has a well known sudorific effect. But, from the frequently repeated connection which I have had the opportunity to observe between the point of mercurialization, indicated by slight affection of the gums, and returning health, I conceive that mercury has a peculiar and extensive influence on the capillary vessels, which serves to dissolve the inflammatory action in dysentery, and to render it one of our surest remedies in most cases of this severe disease. In the treatment of simple dysentery I have been in general very sparing of blood-letting ; and chiefly for this reason, that on the Peruvian coast, the organs of digestion are often in a feeble state, and consequently the repair of the system, after its strength is reduced by blood-letting, is slow and sometimes imperfect; yet, in cases of high excitement, increased sensibility in the belly when pressed upon, or when the motions contained much pure blood, in a recent and acute attack of this formidable ailment, I have used the lancet pretty freely to lower excessive vascular action, or remove a dangerous degree of congestion ; and thus have prepared my patient for the safe and efficacious action of mercury. But in some cases, when the stools contain much blood, and are, at the same time, accompanied with unusual chilliness and general depression, bleeding may be dispensed with, as in the following case.

A soldier in hospital was in hot weather affected with severe tenesmus, and his stools were almost pure blood; the pulse was depressed ;

the tongue was yellow and furred; the lower extremities and belly were cold, with slight occasional perspiration confined to head and neck. He was put at once on a diluent and farinaceous diet; took eight grains of calomel and one of opium, morning and evening; emollient cataplasms and lavements were duly employed, and on the fourth day of this treatment, his mouth appeared gently affected. This indication of mercurial influence was followed by gentle but general warm diaphoresis. Griping pains and tenesmus ceased; the patient voided yellow feculent stools; and there was no longer any appearance of blood in the motions. I may add that while in this convalescent state, the patient was seized with an aguish fit. He was kept on diluents for a couple of days, on each of which there was manifested a well-formed paroxysm of quotidian ague. He took opening medicine, which acted freely, and carried off motions of a yellow appearance. On the third day of the fever he took quinine, and in two days more, the intermittent was cured, and the patient did well.

This complicated case shows that blood-letting may sometimes be very safely and properly avoided, even though the character of the dejections be highly sanguineous. The precedency, however, due to the lancet under the opposite circumstances, of local pain with general excitement, is the more worthy of attention, since it is a fact, that, as mercury begins to show its effects, or as it approaches that point of saturation indicated by a corresponding change in the condition of the salivary organs, it increases the frequency and force of the pulse before mild ptyalism is established, or before the constriction of the intestines is relaxed, and the condition of the extreme vessels or capillary system altered. But, should febrile action happen to be considerable before mercurialization is resorted to, even without the previous subtraction of blood, no sooner is the system fairly brought under its influence than the consequent opening of all the sluices, perspiration, exhalation, and secretion, co-operate in reducing the pulse and moderating or removing every bad symptom. Knowing such to have been the usual beneficial operation of mercurialization in numerous cases that came under my own superintendence, I think it is correctly stated by a modern writer,* that "mercurial preparations generally possess in a higher degree than any other known medicine the power of changing the condition of action in the extreme vessels of the circulating system throughout. It is for this reason that it is so important an instrument in the hands of the physician in so many and apparently dissimilar complaints; and it is proved by experience to exert no greater influence over the secreting vessels of the liver than it does over those of the intestines and mesentery." This is matter of fact and experiment, which all who have the opportunity of observation and practice in the delicate climate of the Peruvian coast, to which my observations more particularly refer, may repeat and verify, for their own satisfaction and the good of the sick. And here I may be allowed to offer an opportune warning, viz. that the patient, especially if a delicate Limenian, should avoid drinking cold water, or cooling beverages, or exposure to a current of cool air, while under the influence of mercury, lest the cutaneous secretion should be suppressed, and the salutary action of this remedy disturbed, or its effects too much concentrated on the bowels and internal organs.

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* See Graham on Indigestion.

I think myself warranted by experience in remarking, that in negroes the system is not so easily brought under the influence of mercury as in Indians and Europeans. In elderly people, and in those of broken down constitutions, the capillary vessels appear to be less capable of taking on a healthy and vigorous mercurial action, and for such persons the mercurial treatment is of course less appropriate. But the Indian, recently arrived from the mountains, who is seized with dysentery on the coast, is more susceptible of an easy cure of this complaint by mercurialization, than many among the more delicately framed and dissolute Limenians, in whom the vascular, like the muscular system, is comparatively weak and lax, while the nervous system, likewise, is in those addicted to debauchery less sound and vigorous. And though it is objected to mercury, that its effects on the nervous system are pernicious, especially when injudiciously employed, or too long continued, these evil consequences are, perhaps, to a still greater extent, chargeable to the account of many other useful remedies, not even excepting that indispensable drug, opium; for the excessive use or abuse of this and other medicinal agents from the vegetable kingdom, produces nervous debility, and exhausts the vital powers. We must, therefore, continue to use mercury in a variety of diseases, not excepting dysentery, till we find a less exceptionable substitute; and it is no small recommendation of this remedy, that, if its good effects are not always complete in Peruvian dysentery, they are at least predominant. I do not say that the plan which is here recommended, and which I myself, as well as several other foreign, and even native practitioners in Lima, have adopted in public, and, as often as circumstances did permit, in private practice, is the only good curative method in all such cases of dysentery, as those in which we found it deserving our greatest confidence. But, taking impartial observation, and ample practical experience of the fact, as the foundation of my own convictions on this subject, I can confidently and conscientiously bear witness that mercurializing the person affected with dysentery, in the manner which I have described, (and as this disease most usually presents itself on the coast and in the intermediate valleys of Peru,) is really safe and good practice, and when properly conducted, it will, I am persuaded, be more generally crowned with success than any other plan of treatment which I have found recommended in books, or seen applied in actual practice.

Regarding the administration of mercurial remedies, in general, in this disease, and of calomel, in particular, I observe, that, though in general it be a sovereign remedy in the hands of those who know how to use it discreetly, in such common cases as I have taken pains to characterize, just as bark is known to be a very superior remedy in ordinary cases of ague; yet it is no more an infallibly specific remedy in dysentery than bleeding is in every case of inflammation of the lungs; nor does its administration necessarily supersede the co-operation of other means of relief; and there are, moreover, circumstances under which its exhibition is fruitless and inexpedient. When we witness a person affected by cold and partial sweats with hiccup, or fever and general sweats without any corresponding alleviation in the dysenteric symptoms; when the stools look like flesh-washings, without the appearance of mucous, feculent, or bilious matter; when the inflammation, no longer confined to the lower intestine, extends over the neighbouring viscera, and the belly becomes elevated and acutely sensible to pressure; when such is the state of the patient, even should he have been previously bathed and bled till he can hardly bleed any more; should he, in the hands of the consultation, have passed through all the routine of emetics, ptisans, chicken-soup, clysters, oils, cawls, plasters, blisters, and sinapisms, we may freely confess that, under these calamitous circumstances, calomel is a remedy which we would never propose or recommend. In such extreme cases, the membranous texture of the diseased intestines is too extensively disorganized, and the capillary vessels are no longer able to take upon them a sanative mercurial action. Cold extremities, a thready or imperceptible pulse, and relaxation of the *sphincter ani*, indicate that death is, in most such instances, very near at hand. In so deplorable a state, the Peruvian patient is aided by the priest, and his doctor prescribes clysters of the decoction or infusion of bark, or orders ice inwardly as the last mean, when, to another person's touch, the apparently moribund patient outwardly feels as cold as the iced-water he drinks; and when the feeble powers of ebbing life are concentrated, without being able to rally again from their last retreat in the internal recesses of the body.

It is not, I think, in these circumstances, much discredit to phlebotomy, calomel, or any other principal remedy, to say that it offers but little chance for recalling vitality and circulation to the surface and extremities, or energy and health to the general system. But, in conditions apparently the most hopeless, the female practitioners follow the physician, and really can boast of restoring a few to health, by herbs and nostrums of their own unpublished Materia Medica, which the quack doctress carefully conceals from the scrutiny of the regular doctor, and curiosity of the protomedical tribunal, inimical to her fame, and to the alleged abuses of her wonder-working xeringa or clyster syringe.

While offering these remarks on this important subject, I should not omit to mention certain diversities in the mode of curing dysentery, which several French individuals resident in Lima adopt for themselves or recommend to others. For example, a commercial gentleman, who had long suffered from a dysenteric attack, of which he had thirteen relapses, was at length told by his native medical attendant, that he had no remedy left him to be tried, unless, as a last resource, he would submit to take calomel. To this proposal, the patient replied, calomel is an English remedy; but I am a Frenchman. I wont have it. I therefore, says this gentleman, took my own way of it. Observing that when in best health it used to cost me much trouble to digest two meals a-day, I resolved in my sickness to subject myself to one meal only, which consisted of rice plain boiled in water, with a trifle of salt to it. About eight hours after this meal, the stomach used to feel empty, and then I drank a glass of lemonade, and afterwards took some of this beverage as often as I felt inclination, especially during night. Every three or four days, lest there should be any accumulation in the bowels, I took a little cream of tartar in my first or morning draught of lemonade. My rice diet, with little variation, was continued for one year, and after this manner I cured myself and many others.

Betwixt this patient's treatment of himself and that pursued by a countryman of his own,—a scientific dentist in Lima,—for a dysentery he also became subject to, there was a wonderful contrast; though in the latter case the result was equally successful, and the end much sooner attained. The dentist's pulse was about 80; the tongue very foul; tenesmus most troublesome, and attended with slimy dejections, but little or no appearance of blood, and he had no pain in the belly. He cured himself with the famous panquemagoga of Le Roy, taken according to the usually prescribed method.

Leaving these illustrations of somewhat popular, though non-medical practice, I may state that, when I resided in Lima, a French practitioner of fair reputation cured dysentery by emollient plasters to the belly, and starvation,—that is, only allowing gum water as food, drink, and medicine, for weeks together. But this treatment, which it is reasonable to infer that he must have found frequently successful, since he trusted in it, necessarily occasioned such exhaustion, that I remember being once called in on the thirteenth or fourteenth day of its application to an elderly man, whom I found it necessary to succour quickly with such restoratives, as arrow root and chicken soup, lest he should perish, though not of the disease, but of long starvation and consequent inanition.

*Complicated Dysentery.*— Of those complicated forms of dysentery which frequently occur in Lima and other parts of the Peruvian coast, where hepatic disease may be said to be endemic, we naturally look for, and very frequently meet with different degrees of disease of the liver, co-existing with, and also preceding dysentery. To imagine, as some individuals do, that, when such complications present themselves, whether in the acute or chronic form, the disease of the liver must always be secondary, and only the sequence of high irritation or inflammation in the bowels, is, in effect, the same as if one were to say that the liver alone, or jointly with the stomach, cannot be the seat of primary derangement, leading to intestinal irritation, inflammation, constriction, and, in fact, a perfect colitis or formal dysentery. An opinion of this sort is too exclusive and improbable in itself, and contradicted by facts which every practitioner in Lima has it always in his power to observe and ascertain.

I have known in a delicate young lady, who had suffered greatly from visceral derangements during former years, that the frequent repetition of hot and acrid evacuations, induced by feelings of suppressed annoyance, (" incomodidad suprimida,") had excited an attack of piles to which she was liable. The piles projected outwardly to a large size, and became extremely inflamed, and attended with much local uneasiness, and tenesmus followed by general irritation, tenderness in the belly, nausea, and finally dysentery, which proved fatal.

Chronic visceral obstructions habitually disturb the equipoise of the circulation, and while they favour congestion in the abdominal blood-vessels, very frequently produce bleeding piles, or intestinal hæmorrhage. And as the irritation or inflammation attendant on piles and simple dysentery may spread along the continuous mucous surface, and affect the contiguous viscera, or extend themselves to the liver and stomach, as well as to every portion of the intestinal canal; so, also, an original attack of hepatitis, various causes of deranged digestion, or biliary derangement connected with mental vexation, or the passion of anger, a previously diseased liver passing from the chronic to the acute mode of action, from any new cause of excitement;—are so many affections which may extend their effects to other organs, especially the great intestine. We may thus understand the vulgar division of dysentery into two great and primary species—viz. the high and low, or *vicho alto* and *vicho bajo*.* The former, or *vicho alto*, is equivalent to dysentery complicated with liver disease, generally considered most urgent in its symptoms; and the latter, or *vicho bajo*, is conceived to have its chief seat in the large intestine, without a coexisting lesion of the hepatic organs; and whether acute or chronic, so long as its effects are principally confined to the lower belly, it is classed with those cases of simple dysentery of which I have already given several examples. I am disposed to believe that any more refined division than is marked by this vulgar distinction would not, in general, much tend to simplify the pathology or improve our practice. We may, if we please, sum up as many species as this disease has forms of combination with other diseases, as syphilis or scurvy, &c.; and thus have the syphilitic and scorbutic dysentery; or, in consideration of the origin of the malady, we may enumerate its species according to the nature of its exciting or occasional causes, such, for example, as cold damp air, iced and acidulated drinks, anger, sundry foreign and irritating bodies lodged in the bowels, as impacted fæces, curd and molasses, the indigestible fruit called *lucuma*, walnuts, dates, unripe figs, olives, and to enumerate no more such occasional causes, the small cocoa-nuts of Panama,—always in the hands and mouths of Limenian children. We may in this way multiply species, as some native physicians do, without thereby better elucidating the pathology of the disease, as illustrated by the dissections which Unanue performed in the anatomical amphitheatre of Lima.[*]

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* Vicho or bicho, is a general name for small and annoying insects; and a relaxation of the *sphincter ani* and consequent protrusion of the gut when at stool is a common disease on the coast and in the warm inland valleys of Peru, which is often supposed to be owing to the introduction of insects into the rectum. In this way the term vicho has been applied at first to signify this local disease, but through time it became a general term expressive of dysentery; in which sense it is now received in Lima.

Among the class of farmers, graziers, and bakers, of whom we formerly took notice when treating of diarrhœa, who are in continual agitation, ride about a great deal in the sun, and are in everlasting displeasure and excitement, with unwilling slaves and others employed in forwarding their works,—bilious movements, and biliary ailments are continual; and they have daily recourse to the juice of sour oranges in their soups, and acidulated cooling drinks as antidotes to their habitual infirmity. With all the angry and turbulent emotions in that country, where the mind is mobile, and the physical constitution easily disordered, we find that the hepatic organs powerfully and readily sympathise, as if through them all the fountains of bitterness discharged themselves. Persons more particularly subjected to such choleric disturbances form a large portion of the dysenteric patients seen in town, and on the coast generally; and thus an attack of hepa-

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[If our readers will turn to the forty-eighth volume of this Journal, they will find, at page 386, a paper on the Dysentery of the Island of Trinidad, by Dr Lynch O'Connor, in which the most destructive form of that distemper producing sloughing of the rectum, and the whole intra-pelvic cellular tissue, and also several of the muscles, is ascribed to the ravages of an insect, the Bische or Bicho, supposed to be introduced by the ova of the animal, deposited in the mucous membrane of the rectum while the individual is evacuating the bowels. The existence of this cause Dr O'Connor properly doubts; and there can be no question that the disease is the effect of violent inflammation of the rectum proceeding to mortification.—EDITOR.]

[*] See pathological observations and dissections in the Appendix.

tirrhœa or bilious diarrhœa, terminates not rarely in dysentery. In such cases, though a structural derangement of the liver be not always detected, yet the habitual disorder of its functions deserves the consideration of the practitioner who undertakes the cure of the dysentery,—here but a secondary evil,—acknowledging the liver's priority of unhealthy action in the course of morbid changes. This kind of dysenteric termination we occasionally witness as the result of acute hepatitis, accompanied with high and well-marked excitement of the general system, especially in men whose business or pleasure invites them to the coast, but who are accustomed to the frequent use of ardent spirits and to the cooler climate of the mountains. I have only seen a very few such cases, and these, on account of their severity, were attended in consultation. I cannot, therefore, from adequate experience, speak confidently of the best line of practice in this very acute form of disease. But I may be allowed to express an opinion that, here, as in other cases of acute hepatitis,—in which mercury is known to be so valuable an assistant to the lancet,*—after prompt and early bleeding, both general and local, according to the urgency of the case, the patient should be mercurialized with all speed; for the disease is formidable, and when bleeding and emollients alone are trusted to, I have observed that it is apt to pass through the stages of primary excitement, and great congestion, to a violent hepatirrhœa; and thus, by gradations, to a fatal dysentery. When this is the unhappy result, the evacuations, from being of a mixed green and yellow appearance, become tinged with blood, the lower belly becomes painfully sensible to pressure, especially over the *caput coli*, troublesome tenesmus comes on, the evacuations appear more scanty, and mixed with curdled blood, or the appearance of minced meat, (which are not always fatal signs,) and they may be interspersed with sebaceous concretions, resembling orange seeds, or pieces of the fruit called tomate :—which latter appearances are sure to give rise among nurses to the idea of an existing empacho, which encourages them to apply the *xeringa* even after the presence of gangrene and hiccup may have made the doctors cease to afford hope or consolation.

A stout Chilean was once sent to me from the Port of Callao to Lima, to be cured of a dysentery originating in hepatitis, to which an hepatirrhœa had supervened. He had passed through the two first stages of acute congestion and bilious flux before I saw him; but the remedies previously used did not arrest the dysenteric course of the disease. I resolved upon mercurializing as quickly as possible, and fortunately succeeded in time to save him. The patient in the course of his illness voided several portions of considerable length, of a membranous tube, which presented the appearance and shape of intestine. He soon recovered, so as to be fit for his ordinary occupations, but remained for a considerable time after subject to slight relapses of tenesmus, with bloody and slimy stools, which he attributed partly to a familiar disease, (piles), aggravated by occasional cold, indigestion, or heating drinks; but these minor invasions he always repelled by a dose of castor oil in the morning, followed, for one or two nights, by a dose of Dover's powder at bed-time.

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* Being called to an Englishman who was attacked by acute hepatitis in Lima, I found him with a full, frequent, and bounding pulse, with fever and general excitement, which increased rapidly. But learning that this traveller was given too much to wine and ardent spirits, &c. I was afraid lest blood-letting should not be attended with the best results, as I had known venesection in some other cases of this sort followed with too much collapse; and I instantly gave him a scruple of calomel. A few hours after he took it, his nocturnal fever increased; but next morning I found him in a general perspiration, with pulse and fever greatly reduced; and his mouth beginning to be affected; he took opening medicine;—mild salivation ensued, and he recovered.

When any case of dysentery, of the character now described, appears to have taken its origin from hepatic derangement, and when the disease is sustained from this source, (as I have illustrated in showing how bilious diarrhœa, excited by fits of anger, and other causes, induce or glide into dysentery), it should be considered as one of those complicated forms of the disease which corresponds with the *vicho alto* of the Limenians. Cases of this sort are liable to frequent alternations, sometimes better and sometimes worse, or they become chronic; and it will be often found that, though general and local bleeding, the warm bath, and other quieting means, may each have their proper time and place assigned them in the course of treating such complaints, and perhaps be found to suspend or remove an attack, yet, sooner or later, the administration of mercury by inunction, or otherwise, will be most advisable, with a view to eradicate a disorder so troublesome, and so apt to recur on slight provocation. The following cases appear to have originated in biliary disorder.

1. A countryman, well advanced in years, led a life of great activity, exposed to sun and weather, and was continually annoyed and displeased with slaves and others around him. He was subject to bilious attacks, and accustomed to take in his *caldo* or soup, a few drops of sour orange juice as a corrective. On one occasion of being annoyed more than usual by the incursions of "Montanera," or predatory troops, he fell ill with a bowel complaint, and after remaining for some time on his farm, he came to town to be cured. A consultation was called, and I, among others, saw him, with the skin dry, the tongue rough and coated, of a dirty and somewhat yellowish appearance; there was no thirst, very little fever, the eye tranquil, the spirits good, and if allowed, he could have eaten something more substantial than the spare diet he was confined to. On the right side, when pressure was made over the flexure of the colon, some unusual sensibility or pain was felt; but the liver did not appear to be in any way enlarged, though its functions were deranged. The disease in its origin was of a bilious character, the stools being copious, and of a green-

ish bilious hue; afterwards they became more of a slimy appearance; and then came on some tenesmus and dysenteric stools; these being at one time white and gelatinous-like, at other times of greenish aspect, with mucus on the surface, and mixed with something like minced meat, "carne picada." This well-confirmed case soon assumed a more hazardous type, and the patient died in the hands of a native practitioner, of whose treatment I can give no account.

2. A young gentleman, of commercial engagements in town, felt uneasy, thought he had taken cold, and complained of anorexia with a sensation of weight and heaviness at the stomach. His tongue was furred and yellowish; pulse 70 and full. For several weeks he felt his feet cold, and could not warm them, though he had tried both wine and punch for that purpose; fire in so mild a climate being only used for culinary purposes. In this state he drank a glass of whey in the morning, but it was soon thrown up again, and of a bitter taste and green colour. After this came on tenesmus with small and frequently repeated hot stools, which were thin, and apparently consisting of bile with some mucous matter. He now betook himself to bed, and felt easiest when he lay on his back; but there was no pain occasioned by moderate pressure on any part of the abdomen; when he lay on the right side he felt somewhat uneasy, and especially in the act of turning about in bed; but when he lay on the left side, he observed that gripes were sure to come on, and also repeated calls to stool with more exigency than execution—as sometimes he voided nothing, though irresistibly moved to try it. The middle lobe of the liver was very considerably enlarged, forming a prominent tumour that, in form and size, might be compared to a small roll of bread. During the two preceding years he had suffered an attack of dysentery, the latter of which was more serious than the first, and was attended with symptoms of acute hepatitis, for which depletion and other means had been employed by a respectable native practitioner.

On this occasion, when the dysentery was only in its commencement, I began the cure by giving at night twelve grains of calomel and one of opium, with another of ipecacuhana, by the aid of which he slept comfortably and perspired freely. In the morning he took a drink of whey, and voided three copious stools of grayish and feculent appearance; after which he turned about with ease. But the enlargement of the liver was now very distinctly felt as before, and it betrayed little sensibility on being pressed upon. After this the patient took one grain of calomel with half a grain of ipecacuhana, night and morning, till the salivary organs were somewhat affected. The tumour in the liver was thus soon reduced to small bulk, and the gentleman changed climate by a voyage to Chilé, where he hoped to complete his recovery by immersion in the hot baths of Coquimbo.

Dysentery, in its acute form, I have seen complicated with hemiplegia; and, in one or two instances, with ague, to which temporary mania had supervened. Chronic disease of the digestive organs, and enlargement of the spleen and liver consequent to intermittents, or other disorders, are not rarely observed on the Peruvian coast; and as these affections predispose to dysentery, a casual indigestion, a mere cold, over-exertion, a shooting or a coursing expedition, (Sunday and holiday amusements very common among foreigners in Peru,) are some of the ordinary occasions, which every now and then prove the exciting causes of this serious malady; and in instances of this sort, the liver is sometimes extremely sensible and enlarged, and the motions unusually mixed with blood. But calomel with opium, or mercurial inunctions, preceded by blood-letting; the warm-bath, and emollient enemata, are, in such cases, proper curative means. The *Hyd. c. creta*, combined with Dover's powder, might also be tried in cases of this kind, though of its efficacy I have little experience; having chiefly trusted to calomel where a mercurial preparation was indicated.

Cases now and then occur, of ague and dysentery complicated together, and upheld by visceral obstructions, (enlarged liver or spleen,) in which mercury will be found necessary for the cure. I particularly recollect a case in which the seasonable use of mercury might have prolonged the life of the individual,—a gentleman, who had at one period suffered greatly from agues on the southern coast of Peru, and had afterwards, when in Lima, lived very generously. He had always an hepatic appearance, but was not an actual invalid, till at length he was seized with febrile symptoms and flux, which, after a few days, ended in dysentery, terminating fatally. The liver, of which this respectable foreigner never complained, was observed in his last illness to project backwards, elevating the short ribs; and after death, the substance of this organ was found to contain a very large collection of purulent matter.

Of the scorbutic complication of dysentery, I never had the opportunity of witnessing an example; but I once attended in consultation a Limenian lady of a delicate and cachectic habit, who was affected with an hæmorrhagic scurvy of the gums and palate, which were swollen, fetid, and partially sloughing; slight pressure on the epigastrium occasioned pain; she had repeated bilious vomiting, and copious spinage-coloured liquid stools, sometimes holding green mucus floating on the discharge; at other times the motions were more consistent, and looked like minced grass. She nursed one child, and was weakened thereby. She suffered on different occasions from scurvy in the mouth, was irregular in her eating, and subject to frequent diarrhœas and indigestions. On this occasion, the disease, as above described, (and which proved fatal in a few days,) came on just after the patient had been cured of tertian by the use of quinine. The general unhealthy and spongy state of her gums and her scorbutic ailments, most probably depended on imperfectly assimilated nutriment, and, therefore, an imperfect supply of healthy blood ; and it may be readily conceived how either diarrhœa or dysentery thus complicated must present formal obstacles to the influence of remedies.

In those melancholy instances where dysentery and scurvy meet in the same person, I have been assured by Dr Tordoya of Lima, (one of the most respectable physicians in Peru,) that, when himself confined during the siege of Callao, under the command of that stern royalist governor, General Rodil, and at the same time intrusted with daily attendance upon hundreds of sick, he never could prevent the fatal termination of the scorbutic complication of dysentery, until he ventured upon mercurial preparations; but that, when he was able to mercurialize the system, he was then sure to save his patient.* Dr Tordoya had ample opportunity of observation, as he was confined to the castles and in charge of its sick, during a period when upwards of 5000 individuals of royalist family or party, among whom were most of the flower and nobility of the country, perished of mental and bodily privation and distress within the walls of the fortress. An idea of the distress, hunger, and sickness endured, may be formed from the following account of it, which the writer received from the mouth of a lady who had been a sufferer in, and witness to, all the horrors of the siege of Callao, which was broken up in January 1836.

Almost all were affected with scurvy. In some the gums became black, putrid, and pestiferous. Large cardinales or dark marks on the skin, which looked like contusions, or the effects of blows with a stick, started in some ; and smaller marks or spots were very common.

Many had bowel-complaints ; the evacuations were frequent and excessively fetid, sometimes without blood, and at times with blood, as in dysentery. With many the feet and legs became swollen, but some that were affected in this manner escaped, while those who were attacked with fatiga certainly died. From that time to this, (*ronchas coloradas y saltiadas*), red blotches appear here and there on all parts of my body. We had to eat horse and ass-flesh, rats, *petacas*, (or leathern portmanteaus), saddles, and round balls of lucern or alfalfa seed. Our commonest food consisted of rice boiled in water,—salt meat from the north,—salt fish and crabs. It was only the rich who could afford to have fresh fish. One egg was worth three dollars ; one corvina or conger was worth a doubloon or an ounce of gold ; a hen cost three doubloons, and every thing else in this way, according to the necessity of individuals and families; for, to supply the necessities of a dying child, What sum could be asked that would not be paid by a wealthy and powerful family like that of Torretagle ?

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* Should any one here inquire if the mercurial practice would be good in purely scorbutic cases, in which no dysentery existed, I may reply, that, for mere scurvy I think neither Dr Tordoya, nor any practical physician in Peru, would approve of mercury, and therefore we may believe, that, in the cases which occurred in Callao, Dr Tordoya was only able to mercurialize the system where the vital powers had not been excessively reduced by the scurvy, and when, by counteracting the local disease or dysentery, the most urgent of the two, the good effects of the mercury, more than compensated any ill effect which this remedy could have operated on the scorbutic diathesis or general morbid affection of the system.

*Chronic Dysentery.*—On the treatment of the chronic modifications of dysentery, I have to observe that in the year 1830, when I was appointed to take charge of the medical wards of the native military hospital Sant' Ana in Lima, I found among the patients a great number of dysenteric, and several hydropic, chronic disorders. The dropsical patients were passed over by my predecessor in a very easy and cursory manner,—by ordering some simple aperient and diuretic drink to be alternated with the common nourishment, a little meagre soup or mazamorra ; and the dysenteric patients who had survived the acute stage of this disease, which was, as I understood, always combated by the lancet, were treated by mutton-tea, barley-water, emollient drinks, frequent clysters and oil, or oil and manna purgatives, *though the intestines had no longer any feculent deposit to be carried off by physic.* The dread of giving the patient any thing to bring on empacho or indigestion, induced the doctor to keep his starved-like sick upon thin fluid diet for months together, provided life could endure so long. The consequence of this treatment was, that comparatively few dysenterics ever recovered ; and many of those who appeared to convalesce, fell victims to a languid inflammation of the lungs, or pulmonary consumption, obstinate diarrhoea or dropsy. Under illness so protracted the vital powers were wasted, and the heart and arteries were not capable of vigorously keeping up the remote circulation of the surface and extremities. This state of debility was favourable to inward congestion, and protracted evacuations, which it would be worse than folly to attempt to remove by general bleeding, seeing that general debility, here increased by the lancet, could only give deeper root to the lingering malady, which had its origin in a local inflammation and turgescence of the mucous membrane, and capillary vessels, of a certain portion of the intestinal passages. In the inflammatory state of these organs, the modern physicians of what is styled the physiological school, and who celebrate so warmly the efficacy of leeching, have offered good reasons against trusting too much to general bleeding, which is known to be more serviceable in inflammation of serous than of mucous membranes. But, in chronic dysentery, whether complicated with visceral obstructions, or still more simple in its kind, I have found that, even local bleeding might generally be dispensed with, and that, whenever the patient's condition admitted of the remedy, a great waste of blood, strength, and time, to say nothing of expense; in a word, that a great waste of useful lives might be saved by the method successfully adopted, of administering calomel with opium, as already stated in the preceding details.

In taking medical charge of the military hospital at Lima, through the recommendation of a distinguished friend, General Miller, who at the time commanded in the capital, I did so with the professed object of reducing, by a different mode of treatment, the excessive mortality which dysentery had occasioned among the native troops. And to effect this most desirable end, I did not hesitate to avow that the sovereign remedy to be employed without the exclusion of the auxiliary means, as suited to any particular case, was calomel, which many disapproved without trial, and against which there existed a general prejudice on the score of its being an English remedy, and only fitted for eaters of roast-beef.

Of those famished dysenterics who had been for several months in the hospital, and most of whom ultimately perished of colliquative diarrhœa, I declined the special charge; because I wished to give the proposed remedy a fair trial on the coast, as I had formerly done in the inland valleys of that country, where dysentery and hepatic obstruction are often conjoined, and where I found calomel with opium to be quite as much of a specific as any medicine well can be,—that is, it hardly ever failed to cure the disease.

As hospital-physician, I selected one or two of those chronic cases, to which I have alluded, in which the patient's constitution was not yet altogether undone by continued disease and starvation; and I had the good fortune of curing these, by mercurializing the system.

The same method was attended with unfailing success in all the recent cases admitted into the hospital, and, consequently, placed under my immediate charge, during several months that I had the honour of acting professionally, and without emolument, in the Peruvian military service.

It has been publicly stated by Major Joaquin Gineres, Excontroller of Sant' Ana,[*] the military hospital in Lima, that before I took charge of the physician's ward, according to the entries in the hospital books, 464 men died in the hospital in the course of eight months, and that of these two-thirds died of dysentery.

It is of no consequence, in a scientific or medical point of view, whether the mortality that occurred among the soldiers in Sant' Ana, on all hands allowed to have been dreadful, took place under the immediate direction, or in the particular practice of this or of that physician. The important fact is, that the soldiers perished of dysentery by hundreds, under the phlebotomic or *sangrado* plan of treatment. Hence, then, the propriety of looking for some better remedy in so fatal a disease; and I think the result of my own practice in Peru, and especially in the Hospital of Sant' Ana, where I made the experiment publicly, and lost not one patient among the many that came under my charge, furnishes very fair evidence that calomel, properly administered, is that better, and most valuable remedy.

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[*] See Suplemento al Rejenerador, No. 39. Lima, 1835.

But, as an instance of the ill-timed application of so useful a medicine, I give the outline of a case which occurred shortly before I left Lima for this country.

A Chilean gentleman, Don D. A., for many years residing in Peru, had a fine stout boy reduced to a state of extreme debility by dysentery, under which he was permitted to linger and waste away for several months, before the practitioner intrusted with the treatment of his case thought proper to meet in consultation another native physician, who, at first sight, detected the real character of the disease—until then misunderstood. The lower extremities were dropsical, and the liver was greatly enlarged. It was determined at the consultation, after the case had been pronounced to be all but hopeless, to give the boy calomel, with a view to correct the hepatic disease, and remove the impediment which existed against a free portal circulation; for, unless these advantages were speedily secured, it was admitted that the unfortunate youth could not recover. But this advice had arrived too late; for a few days after the consultation referred to had taken place, the patient died, and his death was, *ex cathedra,* unwarrantably attributed to a few grains of calomel prescribed him by the two native physicians of the junta, at a time when neither this, nor any other remedy could be of much use.

The case, however, was rendered notorious, and became one of protomedical outcry, without due investigation of the circumstances connected with it. About twenty-four hours before he expired, I saw the boy for the first and only time, at his father's urgent request; and I found that the remedy then used was foxglove, though the vital energies were at the lowest ebb, and the pulse actually retiring from the wrist. This fact will probably speak for the injudicious management of this case; and for its fatal termination, if the general treatment is to be inferred from this last proof of ignorance.

It is not my intention to enter upon the treatment of dysentery when it has degenerated into diarrhœa; though I may observe that, in examples of this kind, magnesia combined with rhubarb in minute doses, or the internal use of the infusion of rhatany,—a root which grows abundantly in Peru,—with camphorated embrocations to the abdomen, may be resorted to in very many instances, with considerable benefit. Nor would it answer any useful purpose to offer to lay down special rules of treatment in all the varieties of chronic dysentery; for the most suitable modifications in treatment will always suggest themselves to the educated and unprejudiced physician who attends to the varying aspect of each particular case.

I may, however, observe in general, that change of climate from Lima to Chorrillos, in winter weather, is frequently of the utmost service in dysenteric cases of long standing, which are unattended with acute symptoms.

I have known such a form of this disease, even while attended with considerable tenesmus and sanguineous stools, to have been removed by a clyster of salt-water from the sea, after doctors, and juntas of doctors, had exhausted their scientific resources in vain.

In chronic cases, the vulgar often effect important cures, by applying injections of the juice of pickled olives, decoction of the Guava leaf, or of the far more astringent seed of the palta.

One man of rank, with whom I was personally acquainted, after having long suffered from dysentery, fled from his doctors in town, and, in a fit of desperation, rode to a sugar-estate in the neighbourhood of Chorrillos, and there partook of the sweetmeats usually called alfaniques, and drank plentifully of *guarapo*, (fermented cane juice,) and so cured himself of an obstinate dysentery. A muleteer, of the village of Canta, much reduced by a dysentery of several months duration, was cured at last by a single glass of rum out of a traveller's flagon: and I recollect the case of a zamba boy, in the house of a friend, in Lima, who, after a very long and unyielding attack of this disease, was cured by having accidentally received, *per anum*, a large syringe full of pure pale rum, (viz. *Pisco*,) instead of a little of the same, well diluted in water, which I had recommended to be administered. The boy became almost instantly intoxicated from the effects of the clyster, and slept for many hours after, but awoke permanently cured of a dysentery which had lasted several months. Such stimulating and powerfully astringent remedies as I have just noticed, would surely be very unfit for the early and acute, though very proper, if we are to judge by the results, in the latter stages of dysentery; and this suggests the reflection that it never can be wise or warrantable to enforce, (as was recently proposed, by protomedical injunction, in Lima,) identity of practice, in circumstances where the indications of nature are irreconcilably dissimilar.

Appendix.—The following pathological observations regarding dysentery, drawn up by Dr Don Hipolito Unanue, when Professor of Anatomy in Lima, and inserted in No. 258 of Mercurio Peruano, I beg leave to present to the attention of the English reader.

First observation made in the Royal Anatomical Amphitheatre on the 15th day of the month of June 1793.

An European, 40 years of age, after having suffered for more than three months under dysentery in the Hospital of San' Andres, and passed through all those degrees which have been described in another place, (Merc. Per. 3 page 126), died on the fifth of the present month, reduced to skin and bones, and emitting a most fetid exhalation.

A few hours after, his body was conducted to the amphitheatre where, on having opened the abdomen, the following appearances were observed.

The liver, spleen, and stomach, the small intestines, the omentum, the pancreas, kidneys, the trunks of the arteries, and veins were without lesion; but the cæcum, colon, and rectum were found in a gangrenous state. The tunics of the rectum were very spongy; its sphincter was lacerated at various gangrenous points, its cavity was sown with the like points, and covered with fetid matter and livid spots, which, on being washed with strong vinegar, presented, from space to space, or at intervals, white islets, remains which escaped putrefaction.

The lower part of the colon from the rectum to near the left kidney, in which space, as is known, it forms various angles, was of a spongy softness, and entirely reduced to a corrupted state. Immediately after the scalpel was introduced, it divided into various pieces like pieces of rag, which were maintained in their place by the greater firmness of the ligamentary bands of this intestine. From the left kidney to the cæcum it was a little inflated, consistent, and marked at intervals with gangrenous points and livid spots. The cæcum was found flaccid, and stained or marked over in like manner. The villous coat was either awanting in these intestines, or it was found converted into purulent mucus, inundated with sanies more particularly collected in the inferior portion of the colon. Thus, in this intestine, as well as in the rectum and cæcum, there was not the least particle of fæces. The urinary bladder was very full, and its sphincter most exceedingly contracted. A small quantity of water was found in the pelvis. All the other viscera of this corpse were observed to be untouched, and without offering any thing worthy of notice.

From this dissection it is deduced, 1*st*, that it corroborates what the demonstrations of Pringle and theory of Cullen make manifest that the larger intestines are the principal seat of dysentery: 2*dly*, that the straight gut and the inferior portion of the colon are the most liable to gangrene; the former because it receives all the acrid matters which descend from above; the latter, because, being narrower than the superior part, and forming two inflexions like the letter *S*, before it joins the rectum, the corrosive matter is detained in its curvatures. Do not the griping pains that precede each stool, in a special manner, proceed from the difficulty which is encountered by the above matter in passing the said curvatures, which necessarily must be irritated, and therefore contracted, or narrowed by the acrimonious contents of the bowels?

*Observation* 2*d*.—A native of Milan, about 60 years of age, of high stature, spare make, and reddish beard and aspect, entered the Hospital of San' Andres, after having for several days laboured under evacuations. According to the narration made to us, his pulse was vigorous, but not febrile; the pains of the belly violent; bilious vomiting; evacuations with a great deal of blood. He was twice bled; they gave him infusion of ipecacuan, and he was assisted by drinks, clysters, and emollient unctions. By the bleeding, vomiting was suspended, but soon after returned. On the 11th day of being in the hospital, his pulse became febrile, the pains and evacuations increased, and he died on the 15th, which was the 5th of July of the present year, (1793.)

The body being conveyed to the amphitheatre and dissected, disclosed the following appearances. The rectum, colon and omentum were in a gangrenous condition. The part most affected was the arch of the colon, which passes underneath the stomach and the omentum, which, on being rubbed or scratched, broke up into many putrid pieces. The coats of the cæcum were interspersed with gangrenous spots. The blood-vessels of the small intestines were found wedged with globules of blood, presenting with sufficient clearness their ramifications by the side of the mesentery. The gall-bladder, to the extent of near four fingers-breadth across, contained very yellow bile, which exuding through its membranes, tinged all the neighbouring viscera. The right lobe of the liver covered all the stomach, extending itself to the left hypochondrium.

The bladder of urine had its sphincter closely shut, and contained some portion of urine. The cavity of the stomach and intestines being laid open, in the large intestines there was found a thick humour, of a colour between yellow and greenish. This same humour was found in greater abundance, and of a yellow colour in the small intestines. There was a portion of it also in the stomach, which regurgitating by the œsophagus, was ejected from the mouth of the dead subject with an insupportable stench. The liver when dissected, indicated that its great size originally belonged to it, and was not a consequence of the disease.

This description shows that the dysentery under consideration was of the bilious species: and the following problem immediately presents itself. Did the liver, by secreting bile copiously on account of its magnitude, give rise to the dysentery; or, did the attack of the disease, proceeding from other causes, occasion the excessive secretion of bile?*

In the month of October of the same year 1793, the following article appeared in No. 291, Vol. ix. of Mercurio Peruano, and appears to have been inserted by the author of the above pathological observations, though the lesson it conveys was, till very recently, considered no better than a fairy tale by the clinical practitioners of his time and country.

*New method of curing Dysentery.*—Dysentery being the most pernicious disease of all that prevail in our climate, as we have repeatedly said, it seems convenient to publish all those methods which experience unfolds as admitting of application, and procuring a happy curative result. Among these should be mentioned the following method of curing dysentery with mercury, which was communicated to us by an able and experienced practitioner, Don Pedro Maria Gonzales, surgeon of the Royal Navy, and of the court of H. M. La Descubierta, one of the two which compose the expedition that make the voyage round the world. His words are the following.

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* In reading this second observation, as also the first, which was published in the Mercury, No. 258, it may be believed that a large number of dysenteric dissections have been witnessed, since the dysenteric corpses, whose dissections have been frequent in the amphitheatre, have presented, with little variation, the identically same appearances or effects.—Lima, 17th day of September 1793.

Excrementitious stools sprinkled with some small portions of white dejections, with or without blood, in which is seen great want of consistence, so that they appear to be formed of threads more or less shapeless; and, lastly, their colour green or yellow, are the circumstances which indicate the use of mercury in cases of dysentery, when these have declined from the inflammatory stage. The form and method in which that mineral is to be exhibited is not, however, a matter of indifference; since, always when the stomach and intestines preserve sufficient energy and elasticity to digest pills, it is given under the saline form. We are not able to determine which species of these salts to which mercury is reduced, may be the most advantageous; but we know that the English require that it be prepared with the greatest exactness, and by a masterly hand.

When the pills pass through the bowels, without undergoing decomposition, they employ mercury in frictions; but applying them always over the situation in which the pains are most lively and permanent; so that, if these exist over the epigastrium and right hypochondrium, the inunctions are confined to those parts in large doses, as of two, three, or four drachms. If the pains occupy the inferior parts, the ointment is applied in lesser doses over them, particularly towards the groins.

Ptyalism does not appear to be necessary for the cure, though upon this account there is no hurry to restrain it, unless obliged to do so from the patient's strength being too much exhausted.

Tincture of opium, which is the composition most in use, they indispensably administer every night, united with the appropriate vehicles and other incrassating remedies, absorbents, and astringents, which they may consider seasonable. They only purge in the beginning of the disease with ipecacuan; and, in course of the complaint, if they deem it necessary, with rhubarb or some other purgative equally mild. The enemata and unctions, which they continue to the last, have for their basis liquid laudanum or the thebaic tincture. The aliment they proportion to the state, temperament, and customs of the patient, in a way that, if he is accustomed to eat meat, they allow him the same, but of white and tender quality, as of chicken, pigeon, &c. In the mornings they order ass's milk in preference; if the stomach bear it well, they give it alone; if not, diluted in pure water, lime water, or, finally, cooling in it red hot iron; and if, after all these expedients, it do not digest, it is suspended.

These are the chief remedies, and the method, in general, with which Dr C. Sullivan obtains, in New Spain, the cure of dysentery, —a result which, until his time, has been very difficult, or impossible throughout the whole of that state.

*Bultos or Abdominal Tumours.*—Visceral obstructions are extremely common in Lima and on the coast of Peru generally, of which many originate during the continuance of obstinate agues that begin with the autumnal equinox, and do not cease until the following summer; or, under the influence of agues still more pertinacious, that sometimes last with little respite for a succession of years. Enlargements of the liver, spleen, and ovaries, are among the most frequent tumours that present themselves to the practitioner in the valleys on the coast. In those cases the heart is very often sympathetically affected. I shall here offer a few examples to enable the reader to form a due estimate of the usual character of those very prevalent disorders.

1. An old black woman, who was employed most of her life as a general servant in cooking, washing, &c. had the omentum, spleen, and liver all enlarged. The heart throbbed loudly, and her "fatiga" was not only oppressive to herself, but sometimes quite distressing even to those about her; and she had dropsy of the belly and lower extremities. By mercurial inunction and aperient diuretics, the liver and spleen decreased greatly in size, and the dropsy left her; but much palpitation of heart continued, and occasional fits of oppressed respiration or "fatiga" were suffered. The omentum was still bulky, though less pendulous, and it seemed to the touch gathered up, puckered, and moveable. This woman and her owner were both rejoiced, during several weeks of apparent convalescence, with hopes of recovery; but, after a considerable interval of ease, dropsical symptoms returned. Ascites, anasarca, and shifting œdematous swellings were accompanied with nocturnal fatiga, or fits of desperate restlessness and oppression, referred to the region of the heart and præcordia; and now and then slight delirium appeared; then followed an imperfect hemiplegia, and a difficulty of intelligible utterance; and her ailment, in spite of every auxiliary means and careful nursing, ended in death.

2. A white man of Spanish extraction, and about 60 years of age, relates that, twenty years ago, he suffered much from tertian ague. This was at length removed or left him; but he remained with obstructed viscera, and since then, he has had the liver enlarged, its right and left lobe being greatly so at present, and, when gently pressed upon, it occasions pain to the patient. Three years ago he was seized with epilepsy, which returned after the interval of one year—afterwards of six or eight months, and subsequently at shorter periods, till of late it comes on every other day, and sometimes twice in the same day. He has a strong preternatural pulsation, extending from the epigastric to the umbilical region, sometimes stronger, sometimes weaker, but always there. The heart, too, palpitates with great force, and the palpitation is on occasions greatly augmented

and hurried; and these affections of the heart and abdominal aorta preceded in point of time the appearance of epilepsy. This person's appetite was generally good, and his bowels commonly regular. His pulse was regular and of natural frequency; the tongue clean, moist. and natural in appearance. He observed, that, if he took a little coffee, tasted a little dram, or any other heating article, it raised an uneasy sensation of heat—" bochorno," from the stomach to the throat, and instantly occasioned indigestion of the food that happened to be in the stomach at the time, and then the only way in which he could relieve himself, was by drinking warm water until he vomited.

3. Many persons affected for a series of years with dyspeptic symptoms, acidity at stomach, and slow digestion, gradually acquire a sallow or jaundiced look, and go about with an indurated or tuberculated liver,—a disorder of which the commencement may have escaped their observation. Others again, with very bulky and indurated livers, though subject to occasional fits of indigestion, generally eat, and drink, and perspire well, just as if they had no such disease. Such chronic tumours sometimes come to suppuration; and when the matter can be safely let out, the patients often recover.

I was consulted by a thin spare man with an abscess in his liver, which was actually matured, and pointing immediately under the ensiform cartilage; and he told me, with indignation kindled on the recollection of the injury done him, " The cause of my disease has been a fit of anger, ' cholera!' which, more than a year ago, was occasioned me by a scoundrel who has deprived myself and children of bread." Since this choleric fit he had not been a day well; and his liver gradually came to a state of suppuration as mentioned, when it was in a condition to be opened with ease and security.

4. A large zamba, about 50 years of age, once consulted me about a bulky tumour in the belly, which, she said, had come on after the retiring of the menses some years before. It consisted of a greatly enlarged spleen. She complained of fatiga, which she referred to the regions of the heart and stomach. The carotids pulsated with a strong jerk, which was observable at some distance from the patient. The heart was affected with strong palpitation; and the woman had, besides, very troublesome cough. But, whether the cough or the sense of oppression called fatiga, first began, she could not recollect.

Her maladies had not much reduced her naturally robust form; and she uninterruptedly continued her daily occupations of washing and dressing linen.

5. Cases of hysteritis produced by sundry irregularities, and on occasions of excessive sexual excitement during the catamenial period, or proceeding from neglected or mismanaged leucorrhœa *(flores blancas)*,—from suddenly suspended menstruation, or lochia, &c.—and terminating in indurations and enlargements that

predispose to scirrhus and cancer of the womb and ovaries, are diseases of frequent occurrence.

Leucorrhœa is a disease which frequently appears to owe its origin, in Limenian women, to a lax fibre, and a weak state of the vascular system, favourable to internal congestion, and a corresponding augmented secretion. Sea-bathing is found to be the most efficacious remedy for chronic affections of this nature.

I have known a woman habitually subject to severe leucorrhœa become pregnant, and, as gestation advanced, her weakness increased daily, and vomiting was so continued as to threaten abortion, from want of due nourishment, and consequent exhaustion. She went to Chorrillos, and bathed in the sea, which restored her to health ; and, from being reduced to a mere skeleton, she recovered flesh and strength ; returned to town, and was enabled to bear the fruit of her womb to a mature period.

In reference to the inflammatory affections of the genital organs, I may here mention, that, in consultation, I once witnessed a case of long-concealed and mismanaged gonorrhœa, in which, as the physician in ordinary attendance related, the inflammation extended from the vagina and uterus to the peritoneum, and terminated unhappily in effusion, and ultimately fatal ascites. The communication of inflammation from the mucous lining of the uterus to the continuous serous membrane, through the Fallopian tube, being of rare occurrence in practice, this instance of it is so much the more remarkable. Some of the worst cases of dropsy seen on the Peruvian coast will be found in their origin attended with acute symptoms,—requiring the antiphlogistic treatment, and complicated with obstructed viscera, or disease of the heart.

6. A negress, about 30, or perhaps more, years of age, waited upon me one morning for advice; and narrated her case in the following terms.

" Here in the belly I have a tumour (*bulto*), and at each menstrual term I feel great fatiga. At one time my belly is lank ; at another time it is swollen, so as to resemble a state of pregnancy. My feet swell in the course of the evening; and sometimes the pudenda appear to be greatly inflated. A year ago there were expelled *per vaginam* two pieces of a fleshy consistence, which were enveloped in blood, and of the figure of a little smoothing-iron. By having got rid of these bodies, my belly diminished in size. After this my health was better for some time. Only a short time since I was attacked with palpitation, which is now so violent, that it sometimes imparts a tremulous motion to the bed in which I rest ; and very lately came on a cough, which is not yet very troublesome. I am married, but never borne a child ; and never had any ' purgacion' (gonorrhœa,) or similar disorder. The menses flow abundantly at their proper periods; and after they retire they leave no traces of humidity behind. I am also naturally of a costive habit, and void very little urine."

I observed that the palpitation of the heart was in this woman's case very turbulent; even in the subclavian and carotid arteries the pulsation was so preternaturally full, and so obvious at first sight, that, across the room, or at the distance of a few yards from the patient, the rising of those blood-vessels appeared distinctly.

At the external iliacs the pulsation was preternaturally great, especially along the course of the left iliac artery, and in the femoral artery at the left groin. In the morning she had no swelling of the feet. The tumour in the belly was very sensible on pressure; and it appeared to embrace the whole uterus, but more particularly the left ovary.

This woman's general appearance was robust; neither extenuated nor fleshy; but rather spare than otherwise.

*Mal de Abajo, or Cancer Uteri.*—Of all classes of bultos the uterine are most dreaded, especially when attended with a sanious and fetid discharge *per vaginam.* When this discharge commences, the woman is seized with the apprehension that she has the terrible *mal de abajo*, or *cancer uteri;* a disease of which I heard comparatively little in the interior of Peru, but one of melancholy frequency in Lima.

When the disease commences at the *cervix* and *os uteri* with swelling and inflammation, much may be done in proper time by antiphlogistic means, and avoiding as rigorously as possible every article of diet, and every indulgence, that can tend to promote the growth of so terrible a malady as this is sure to become when it runs on to ulceration.

In some instances indurated and enlarged uteri, proceeding from various occasional causes, degenerate into what is vulgarly called cancer; but I believe that the genuine cancer will be usually found to have commenced about the *cervix* and *os uteri;* and that the inflammation and condensation of tissues there produced keep up a constant local irritation, and a consequent increased flow of blood to the uterus, which, therefore, becomes gradually enlarged, and more and more deranged in its menstrual functions, before ulceration is yet established. It must be observed, that *mal de abajo* in Lima is rarely a genuine cancer, or in its commencement incurable, though, when its existence is long concealed, and proper medical advice not early taken, ulceration may be far advanced, so as to baffle every remedy. The *mal de abajo* we may consider as most commonly of venereal origin, and therefore in its early stages will sometimes be found to yield to the treatment required in syphilitic disorders. * In such cases, this disease which, when overlooked, is sure to become so formidable and fatal, appears in its commencement as a merely membranous affection; but from not having recourse to proper remedies in time, or feeling reluctant to come under formal cure on the first discovery of the disease, the nature of which is always ascertained by inspection, an excoriation or superficial ulcer in the vagina may soon become a corroding venereal sore, extending its ravages to the substance of the uterus, where it turns out, in most instances, a malignant, incurable, and mortal disease.

It is, when thus confirmed, a lingering and wasting illness, attended with a foul offensive discharge that occasions great discomfort to the disconsolate sufferer, and calls for patience and great attention on the part of the assistants. It is a malady looked upon with peculiar horror, and it gives rise to painful feelings of shame and secrecy in the family it visits; and to the sad patient it causes severe pain, and repeated attacks of hemorrhage, before death arrives as the hoped for deliverer.

The *cancer uteri* of Lima is by the vulgar considered to be contagious, and as they dread this woful malady, they industriously avoid the seat and very house of a uterine patient, and burn her clothes and bedding, &c. after she is dead. But that it is not really infectious on actual contact appears probable at least, as we never find that nurses are affected with it in consequence of their attendance on those who labour under this malady; and even husbands are sometimes found to have long cohabited with impunity with their wives when affected with the *mal de abajo*, before a physician has been consulted. One or two instances of this sort came under my own notice in cases of consultation wherein ulceration of the *cervix uteri* was far advanced before the physicians were called in.

In a ward of the Hospital de la Caridad, where such cases are treated in every stage of their progress, the topical applications chiefly relied upon by my friend Dr Jose Reynoso, the head surgeon of that hospital, is a pledget of lint dipped in a solution of corrosive sublimate in the tincture of myrrh, in proportion of two grains to the ounce of the tincture. But this highly respectable practitioner confesses that his actual cures have been, throughout a long course of private and hospital practice, and a great deal of experience in the uterine cancer of his countrywomen, exclusively confined to cases of venereal origin; while he honestly tells us that, for genuine cancer, he has not found a remedy; though in the most deplorable cases, the doctoress and charlatan often profess to know more, and cure better than "the professors of the university and surgeons of hospitals." Hyoscyamus, opium, and *Conium maculatum*, are internal remedies which seem to moderate pain and relieve irritation. Warm baths are, in many cases, exceedingly soothing and proper; and local ablution is indispensable. For this latter purpose, many washes are in current use; at one time, those of an emollient and anodyne nature are thought to answer best; at other times they apply the astringent and cooling. The decoction of matico and infusion of guaco are both tried; but, as far as I know, without permanent benefit. The latter I have administered internally, and sometimes with benefit, in leucorrhœa; and, externally, I have ordered it to be applied as a wash on several occasions in the "*mal de abajo*," but without any appreciable advantage or success; and as for the Indian remedy *matico*, it is too stimulating for general use in the cancerous ulcer. Rose-water and lime-water are generally less objectionable washes; and these ought to be introduced with the female syringe. It is the former of these, (rose water,) which the women themselves commonly apply before they consult the doctor. When the disease is ascertained to be syphilitic, a wash of corrosive sublimate, directed properly to the affected parts, will naturally constitute a share of the general anti-venereal plan of cure; but, when genuine cancer declares itself, mercury must not be used, as it will only increase the pain and irritation which always attend this dreadful disease.

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* In an essay on uterine cancer, Dr Valdes exhibits, in luxuriance of language "la devastadora furia del galico," or the desolating fury of the venereal disease, which he states as a prevalent cause of that uterine cancer, which, he tells us, carries off a great portion of his countrywomen,—"que arrebata in Lima una grande precion del bello sexo." And if his picture of the corruption and debauchery of his countrymen be correct—"asi una virgen que del regazo tierno de su madre, pasa a los brazos de un esposo corrompido, recibe con alhagos el veneno," he thus bears ample testimony that the public health, over which he is the appointed guardian, would not be the worse of a little salutary mercurialization; since mercury, administered in time, might save the fair sex from a great share of those horrors which he so graphically describes as the effects of licentiousness. Moreover, the Doctor, who is a physician of long standing, assigns as another principal cause of uterine cancer, clandestine pregnancies, and their evil consequences, abortions, induced by poisonous herbs and drugs, whose violent action is not only destructive to the fœtus, but also to the uterus itself. See Dissertacion Quirurgica sobre el Cancro Uterino, Por el Dr Don Jose Manuel Valdes.

It is worthy of being noticed, that the real *cancer uteri* is sometimes seen in Lima connected with scirrhus in the breast; and to remove this scirrhus with the knife while ulceration exists in the uterus is of no use; as a cancerous diathesis exists and the operation neither extirpates the disease, nor prolongs life. Indeed, the additional irritation of the knife may only hurry on cancerous ulceration in the breast; and I would therefore admonish the surgeon, before he consents to the operation, to inquire as to the state of the uterus, which the unhappy patient may not be forward to reveal.

In various cases, when tumours supposed to be of a scirrhous nature, are confined to the breast, we may find that, by leeching and fomenting, the tumour, together with the inflammation that surrounds it, will be made to disappear; and on a few occasions, when the tumour was more circumscribed, and the adjacent tissues not sensibly inflamed, by regulating the bowels, anointing the part affected with *Tinct. Sap. c. Opio*, and keeping it covered with cotton or flannel, I have seen a solution of such swellings procured, even after the extirpation by the knife had been previously recommended.*

In concluding the subject of uterine cancer, I would wish to draw the attention of the reader to the following case.

A lady of distinction in Lima, the Countess of ———, intrusted me with her cure in a case which was very generally believed to be the formidable *mal de abajo*, which, however, was not so. On careful inquiry and examination, it appeared that there was a good deal of purulent discharge from the bladder, but none from the uterus, which contained a calculous concretion that pressed on the urinary bladder, so as to occasion inflammation and ulceration within it.

Besides a daily dysuria, with which this lady was affected in course of her ailment, which had been of long duration, there was from time to time a partial suspension of urine, arising from the urethra being plugged more or less closely, by thick sloughs detached now and then from the internal surface of the urinary bladder. These sloughs, which acted in this manner and occasioned paroxysms of acute suffering, were expelled, as often as they came into the urinary passage, by the aid of the general warm-bath, in which the patient remained immersed so long as her strength permitted, or until the slough was thrown out.

The *os uteri* had a healthy aspect, but so dilated that it would have easily admitted the point of the finger; and, by introducing the point of a silver catheter within its rim, portions of the calculus, visible on inspection *per vaginam*, were easily removed, which had the appearance of soft chalk spotted with fine sandy particles.

By injecting into the uterus several times a day a very weak solution of muriatic acid in water, this sort of uterine calculus was gradually dissolved and washed away, until none of it appeared to have been left behind; and, consequently, the purulent discharge from the bladder ceased.

The urine, from being very turbid and fetid, improved greatly in colour and smell; and the dysuria had terminated, as did also an occasional diarrhœa, which was a consequence of the irritation kept up in the rectum by the pressure of the uterus, while occupied by a foreign body.

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* Iodine I have often used, and also often saw it used by others for the removal of almost every variety of glandular complaints. In glandular swellings of the breast, however, there exists among Limenian patients and practitioners a strong objection against it, whether taken internally, or applied externally; because they believe it soon wastes away the mammae in the female, and in the male there exists an apprehension for the excessive reduction of the testes. How far these ideas are founded on experience, I cannot say from personal observation; but this I can say, that, in cases of *hernia humoralis*, I have found iodine a very valuable remedy: and also in glandular swellings of the neck; though in those of the breast, for the reason assigned, I have not had the same experience of its efficacy.

After two months of promising convalescence, she prepared herself for removal to a favourite country seat about a league from town; and, before the day proposed for her departure, she invited a party of her friends to a sumptuous entertainment.

All were happy about her; and she, remarkable for the warmth of her friendship, and the munificence and generosity of her character, rejoiced in the happiness of her family circle; but, by departing from her regular rules of diet, she brought on indigestion attended with pyrexia. Hence her head was affected; and mania came on, an evil hereditary in her family, and of which she had had a short trial in youth, but now she was old—I should think above sixty,—and after this return of insanity she never recovered her reason again, but died after many months of anxious expectation on the part of her relatives.

In her distracted condition she appeared to realize the saying, that there is in madness a joy which only mad persons know; for though she had her periods of mournful illusions, the bright ideas often recurred, that she had the treasures of Peru at her disposal, and that the gates of Paradise opened at her call.

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## ART. IX.—*Case of Abscess, seated among the Fibres of the Iliacus Internus and Psoas Muscles on the right side.* By JAMES DAWSON, Esq. Surgeon, Liverpool. Communicated by Dr TRAILL.

S. P., Esq. aged 36, a gentleman of active habits, immediately after severe exercise, was exposed for a considerable time to a chilling wind, while in a state of profuse perspiration, and on reaching home, was seized with a shivering fit: feeling himself otherwise unwell, he sent for his physician, Dr (now Professor) Traill.

In two or three days afterwards, viz. on the 23d of June, I met Dr Traill in consultation on the case. With that gentleman's permission, I now transcribe the notes of the case taken at the time, and with his sanction, and under his supervision, they will meet the public eye.

At our first consultation, the patient complained of a degree of stiffness traversing the inside of the right flank,—of some difficulty and pain in stretching out that limb,—and of tenderness at a mere point, about half an inch below, and within the crest of the ilium, and at the same distance backwards, from its anterior and superior spine.

Besides this tender point, there was discovered a slight elevation in the right iliac fossa, situated near the line of approach of the fibres of the iliacus and psoas muscles The gentlest manipulation at this point gave him pain.

Being cognizant of the opinions of Dupuytren, as they are recorded in the very interesting memoirs of MM.* Husson, Dance, and Meniere,† we were prepared for the serious involvment of some of the important structures comprehended within the region of the right iliac fossa. And there is no doubt that this foreknowledge, so to speak, invested the case with more than an ordinary share of interest.

It may be stated in this place, that our patient had been in vigorous health up to the moment of his seizure, and that his bowels had always been regular.

It soon became manifest that leeching, and other depletory measures, only weakened him, without at all checking the progress of the intumescence.

His easiest position in bed was having the trunk elevated, so as to meet the limb, and the thigh and knee gently flexed, and thus supported by means of a doubled-up pillow placed under the ham.

Being aware of the necessity of not wasting his strength, the mildest form of aperient medicine, and of enemata, was employed: the body and bed linen, and the alvine evacuations, were from day to day inspected; but no pus ever escaped by that route. Indeed, throughout the illness, there never was any disturbance nor obstruction in any portion of the intestinal canal, to lead us to expect that the *caput coli* was in any way implicated, or that it was to become the medium of outlet.

By the twelfth day, the boundaries of the abscess (for abscess it was) had so far encroached on the natural hollow in the right flank as to raise the parietes to a level with the crest of the ilium.

We were exceedingly anxious at this stage to detect the earliest sign of fluctuation,—because, among other reasons, some degree of constitutional disturbance had set in, as denoted by a brown tongue, rapid pulse, and occasional, but slight delirium.

On the sixteenth day, fluctuation having been detected, a small cornea knife was introduced obliquely through the parietes, so as to make a valvular opening into the abscess, at a place about an inch inward and downward from the crest of the ilium, and about two inches upward and backward from the superior anterior spine.

Thick pus, of a good colour, but of a fetid odour, escaped in a steady stream. Not the weight of a feather was allowed to touch the parietes while it was flowing.

Numerous small specks, evidently the elements of blood, were noticed in the discharge. So long as the tonicity of the structures urged the contents through the opening, so long we waited, and then the simplest and lightest form of dressing was applied, care at the same time being taken to guard the abdomen against pressure.

Only in a very slight degree was the power regained, to extend the limb on the trunk, after the opening of the abscess.

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* Repertoire, Tome iv.

† Republished in Med. Chir. Rev. November 1823.

During several succeeding days, the irritative fever persisted, and to the former symptoms were now added, heavy perspirations, and frequent intermissions in the pulse.

However, he passed over this period of peril, and at length rallied, so that at the end of six weeks, he was permitted to go into the open air.

We shall not enter into a detailed history of phases through which the diseased structures passed during a period of two years and a-half afterwards.

It is sufficient to mention, that fistulous sores made their appearance in different places; one was situated on the outside of the iliac bone, below its crest, leading us to believe, that an eroded hole of communication had been formed in the thin part of the bone, with the abscess within the pelvis. There was a fistulous opening also, on the inside below the crest, nearly opposite to the one just mentioned.

A regular drain was established also by ulceration, underneath Poupart's ligament, and for several weeks, the matter secreted within the pelvis (but in very small quantity) made its way out at the groin. The glands in this region, and the superficial lymphatic vessels in the upper third of the thigh, became the seat of slight ulcerations during a very long period afterwards.

Finding himself still lame, our patient decided on going to London. He was separately and carefully examined by three of the eminent surgeons there,—but he returned dissatisfied with the result of his visit.

No change took place until the beginning of December 1832,—when symptoms indicative of congestive inflammation of the liver, manifested themselves, and, in spite of every means used, the disease advanced to a fatal termination on the 11th March 1833.

*Tuesday, March* 12, 1833—*Examination of the Body.*—The integuments in the right hypochondriac region were in an empurpled and œdematous state.

There were strong adhesions between the convex surface of the liver and the floating ribs on the right side, the separation of which opened a large abscess in the substance of the liver, from which four pints of matter issued. This abscess had destroyed almost the whole right lobe of that organ, leaving walls of a thickness varying from one-eighth of an inch to one inch.

The exterior of the convex surface, where thinnest, was gangrenous.

The upper convex surface adhered firmly to the diaphragm.

The left lobe was comparatively healthy.

The spleen was healthy. Between the under surface and lower edge of the liver and the ascending colon, were strong adhesions, which seemed to be of recent origin. When these were separated, the abscess was again opened at this point.

The right kidney was more than double its ordinary size, and was seated two inches lower than the left one. Its posterior superior portion was diseased in structure, and had a pale mottled appearance like that exhibited in some of Dr Bright's figures. Some purulent matter escaped into its pelvis, from the contiguous suppurating structures, on cutting into this portion.

The *caput coli* was attached to the right iliac fossa, by very strong, almost cartilaginous adhesions.

The *appendix vermiformis* was tied down by condensed cellular membrane to the colon, and its middle portion was obliterated for about one inch, while its extremity, instead of being closed, communicated with a small abscess seated between the muscular and peritoneal coats of the *caput coli.*

The fistulous ulceration in the integuments on the inside of the flank was in communication with the small abscess, already mentioned as being seated between the muscular and peritoneal coats of the *caput coli.*

The lower fistulous opening in the groin was in communication with an abscess of limited extent, seated in the substance of the *psoas magnus* muscle, and, with another abscess situated between the *iliacus internus* muscle and the bone—what remained of the *fascia iliaca* was found to be inseparably and undistinguishably united or blended with the peritoneum. The muscular fibres, more especially those of the *iliacus internus,* were converted into a yellowish-white, almost cartilaginous substance. The iliac bone was bare to a small extent—about the size of a sixpence—just within the internal lip, about one inch below the crest, but there was no opening through the bone to the outside. A communication had been established during life between the inside and the outside of the iliac bone; but this, it appears, had been effected by the matter flowing over the lip of the crest, whenever the accumulation within had arrived at a point of elevation above that level.

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## Art. X.—*On the Physiological and Therapeutical Effects of Colchicum autumnale.* By Robert Lewins, Junior, M. D. &c. [This communication is an abridgement of the Essay which the Harveian Society honoured by presenting to the Author their Annual Prize.]

In order that the physiological and therapeutical properties of any active medicine be rightly understood, it is indispensable to have an accurate knowledge of the effects it produces, when administered in large and small doses. Above all, it is necessary to ascertain the quantity which can be prescribed with safety.

That we were lamentably deficient on this essential point, with reference to *Colchicum autumnale,* is abundantly evinced by the remarks and prescriptions of medical writers. Indeed, it may be asserted that many highly respectable members of our profession are ignorant of the proper manner, and even of the dose in which this active medicine ought to be administered.

Dr J. Johnson, editor of the Medico-Chirurgical Review, at a public discussion a few years ago, expressed his disbelief that one drachm of the tincture of the seeds given every three hours would produce a fatal effect.[*] The late Dr Duncan, in his Dispensatory, has stated that half an ounce of the tincture of the seeds is the proper dose,[†] and in Dr Spillan's work lately published, entitled a collection of Medical Formulæ, a draught, containing amongst other ingredients, half an ounce of the tincture of the seeds, is ordered to be given every sixth hour, Dr Elliotson prescribed half a drachm of the wine of the seeds of colchicum, to be taken three times a day for a period of three weeks,[‡] and, in another case, he gave the same dose every eighth hour for several days together.[§] Dr Armstrong recommends one, and even two drachms of the wine of the colchicum to be taken in the course of twenty-four hours, and continued for some time.[‖] Dr Barlow of Bath, certainly very high authority on this or any other medical subject, gives the following hazardous directions with regard to its employment. "It may be given either in full doses, so as to purge actively, or in divided doses, frequently repeated. One drachm, one drachm and a half, or two drachms of the tincture of the seeds should be administered at night, and repeated, if necessary, next morning. This quantity will generally purge briskly, but if it fail, another dose the following night will be pretty sure to succeed, at least, as far as my experience goes, I have seldom found it necessary to exceed these doses."[¶] Other distinguished members of our profession have given equally dangerous directions as to the mode of administering colchicum. I may here also remark, that death resulted from a dose of two drachms of the wine of the seeds, given to a patient in a public hospital a few years ago. A fatal case is also recorded by Mr Haden in his translation of M. Magendie's Formulaire, where two drachms and a half of a tincture, made by infusing four ounces of the root in eight ounces of proof-spirit for three days, had been administered; and I may also allude to a case which fell under my own observation only a short time ago. On Sabbath, November 22, 1840, I had an opportunity of seeing W. D. aged 23, who had consulted a distinguished practitioner of Edinburgh, in consequence of pains in his extremities, and cough, from whom he received a prescription, of which the following is a copy:

℞. *Vin. Sem. Colchici Vin. Antimon. a* ʒi.; *Tinct. Hyoscyami,* ʒss. M. S. A tea-spoonful to be taken three times a day, which is equivalent to one drachm of the *Vinum Colchici* daily. This quantity had been persisted in for a week regularly, with the most prejudicial effects. The patient laboured under violent diarrhœa since the second day after taking the medicine, and had he persevered in its use for twenty-four hours longer, it is probable he would have perished. His pulse was 170 in the minute; his strength most alarmingly reduced; he could only speak in a whisper; he complained of great pain in the abdomen; and the bowels had been moved upwards of twenty times in the course of the day. Astringents, in various forms, were had recourse to in vain, until a combination of opium and acetate of lead was prescribed, which speedily checked the exhausting diarrhœa, and obviated the other mischievous effects which had resulted from the improper administration of the colchicum wine.

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[*] See Lancet, Vol. xv. p. 698.

[†] See last edition of Edinburgh New Dispensatory, p. 953.

[‡] See Lancet, Vol. xii. p. 540.

[§] See Lancet, Vol. ix. p. 305.

[‖] See Lancet, Vol. vii. viii. p. 97.

[¶] Cyclopædia of Pract. Medicine. Article Gout.

The effects of colchicum, when administered in larger and poisonous doses, are well exemplified in the following cases related in the twenty-sixth volume of the Medico-Chirurgical Review; which coincide, in most respects, with those which I witnessed in dogs, where a sufficient dose was administered to produce death, as will be related in a subsequent part of this paper.

Madame de B. 25 years of age, swallowed a large quantity (a wine glassful) of the tincture of the bulbs of colchicum, with the view of destroying herself. She was immediately seized with most severe pain in the epigastrium. Two pints of milk were administered in about half-an-hour after the act had been committed, and subsequently two grains of tartar emetic were given. Copious vomiting of a brownish fluid ensued. M. Caffe did not see the patient till nearly six hours after the accident. He found her cold and very pale, complaining of tenderness in the epigastric region, a sense of constriction around the chest, and of great dyspnœa. There was no stiffness nor any convulsive movements of the limbs; the lips were of a purple hue; the pupils were not dilated, nor was the vision affected; the tongue was pale and cold to the touch; there was an almost constant vomiting, but no purging; the pulse was very slow and thread-like; and the patient, who was quite sensible, was tortured with a burning thirst; and every now and then she uttered the most distressing groans. M. Caffe administered iced aerated water, and ordered sinapisms to be applied to the feet, and embrocations to the limbs and abdomen.

On the following morning there was complete prostration of all the vital powers, the retching continued, and the cramps in the feet, although not so severe, were still present. Sinapisms were applied to the thighs, and a few leeches to the epigastrium. The patient became gradually weaker, and death took place in the afternoon—twenty-two hours after the poison had been swallowed.

The body was examined seventy hours after death. Putrefaction had already commenced. Most of the parenchymatous viscera were congested with dark-coloured fluid blood. The stomach and intestines were removed, and set apart for the purpose of analysing their contents. On the following day they were examined, but unfortunately putrefaction had already advanced so far as to have altered considerably the appearance of every part. The mucous membrane of the intestinal canal, in different places, was of a wine-red colour; but no dependence could be placed on the result of such an examination. Equally unsatisfactory was the chemical analysis of the contents of the bowels.

Strange to record, the sister of this patient, a girl of about 20 years of age, made a similar attempt on her life some months afterwards, by drinking between four and five ounces of a weak vinous tincture of colchicum. The symptoms were nearly the same as in the preceding case; violent pains in the epigastrium; constant vomiting, without, however, any diarrhœa; a sense of constriction around the chest; extreme dyspnœa, gradually increasing coldness of the whole surface of the body, and absence of convulsions, excepting in both feet. The pulse was small and very feeble; the pupils were not affected; and the mental powers remained to the last undisturbed, Milk, iced-drinks, emollient enemata, and blisters to the extremities, were the means employed, but without avail. The patient died on the following day, twenty-eight hours after swallowing the poison.

The body was examined forty-three hours after death. The stomach was much distended with gas, and contained several spoonfuls of a turbid inodorous fluid. Its mucous membrane was quite exempt from any appearance of inflammation or unusual vascular congestion; but its texture was much softer than usual, so that it could be easily detached from the submucous tissue in the form of a *detritus pultacé*. Throughout the whole tract of the intestines, the muciparous glands were observed to be very prominent and distinct, and in the lower third of the ileum, the areæ of the conglomerate glands were of a livid colour.

The other organs did not exhibit any obviously abnormal appearances.

In the fourteenth volume of the Edinburgh Medical and Surgical Journal, page 262, another case of poisoning is related, in which one ounce and a-half of the vinous tincture of colchicum was by mistake given to a feeble man, aged 56, labouring under chronic rheumatism. No complaint was uttered for at least one hour after the accident, but then he became sick, next retching came on, with acute pains, referred to the stomach, to which vomiting and purging presently supervened. This state continued the whole of the succeeding night and day, when the alvine evacuations ceased, but the most distressing nausea continued with retching frequently. The stools were in the course of the night often involuntary, but not bloody. Excessive thirst came on the day after the accident, and continued till death, with severe pains of the stomach and bowels, which occasioned fomentations to be employed. In the evening the patient seemed nearly exhausted; delirium appeared; the pulse could scarcely be perceived; he lived, however, through the second night, but died the following morning. On dissection there was no appearance of inflammation of the bowels, but redness of the stomach.

Professor Berndt has noticed (vide Christison on Poisons) the case of two children who were poisoned by a handful of colchicum seeds, and who died in the course of a day, affected with violent vomiting and purging. In the bodies of these children there was considerable redness of the stomach and small intestines.

The symptoms which I witnessed on dogs differ in some material points from those related above, as having taken place in the human subject, as will be seen from the perusal of the following cases. On the 15th December 1840, at half-past three P. M., I administered to a middle sized dog 70 minims of the *Vinum Seminum Colchici* without any immediate sensible effect. A short time afterwards it devoured a large quantity of meat very greedily, and continued gnawing bones for some time with great avidity. At 7 P. M., nearly four hours after he had swallowed the colchicum, he eat another large quantity of beef and lapped barley broth with great eagerness. He was visited for the last time that night, at about 9 P. M., when he appeared in his usual state of health. Next morning, 16th December, at half-past eight, sixteen hours after the colchicum had been given, he seemed weak, low, and very sick. He remained prostrate on some straw in a corner of the room, and could not be induced to move. During the night he had been most severely purged, and in every part of the room were egesta from the stomach, in some places mixed with a fluid of a dark-brown colour, in other places mixed with food, and near where he was lying, there were large watery evacuations intimately mixed with a fluid resembling blood. No attempts were made to vomit during the visits on this day, nor did he express by outward symptoms any indication of suffering acute pain. The eyes were hollow, and had a dull glazed appearance. On presenting food of the same kind that he devoured greedily the previous afternoon, he would not touch it. The prostration of strength, and insensibility to external impressions became greater and greater throughout the day. On visiting him next morning, 17th December, at a little after eight o'clock, he was quite dead, cold, and stiff. The food which had been placed before him yesterday morning had never been touched.

The body, examined at half-past eleven, presented the following appearances; the intestines were found very much contracted and vascular. The internal surface of the stomach presented rather more rugae than natural, and was lined with mucus; its cavity was nearly full of dark-brown coloured bile, and the pyloric orifice was contracted; the duodenum was much injected and coated with mucus; the whole course of the jejunum and upper part of the ileum were of the most intense red colour. On the lower part of the ileon were observed a number of dark streaks slightly raised, running in a longitudinal manner. The large intestines were likewise very vascular, although not so vivid as in the small intestines. In the ileon a large tapeworm, measuring considerably upwards of a foot, was found dead. There was not the slightest appearance of food or fæcal matter in any part of the intestinal canal; a large quantity of bloody serosity mixed with thin mucus lined the parietes in almost their whole extent. The gall-bladder was full of dark brown bile, and the urinary bladder was distended with natural coloured urine. All the other organs were perfectly normal.

In the Philosophical Transactions of the Royal Society of London for 1816, there are several experiments detailed by Sir Everard Home, for the purpose of ascertaining the effects produced on dogs by injecting the vinous infusion of colchicum into the veins. In his first experiment he injected into the jugular vein thirty drops of colchicum wine (made by infusing two pounds of the fresh roots in twenty-four ounces of sherry-wine, in a gentle heat for six days, the spirit being previously carried off by heat,) diluted with a drachm of water. It produced a tremulous motion of the muscles and fluttering of the pulse, with some nausea. In fourteen minutes the pulse increased in frequency from 140 to 180 in the minute, but became intermittent. In four hours it still intermitted, but had fallen in frequency to 120, and was of natural strength. In seven hours the pulse was in every respect natural; the dog had a natural stool and appeared in perfect health. In another case, where 160 drops were injected into the jugular vein of a dog, the dose proved fatal at the end of five hours, after having produced, first, loss of voluntary motion, then tremors and great debility, with nausea, vomiting and purging, the pulse being rendered irregular and weak; the inspirations varying in like manner, being in ten minutes, 40 in the minute, which is the natural number; in twenty minutes 30; and in one hour and a-half 54.

On opening the body, the stomach contained mucus tinged with blood, and its internal surface universally inflamed. The same appearance in a less degree, was met with in the jejunum and ileum, and more strongly marked in the colon than in the ileum.

For the purpose of testing the accuracy of these investigations, I performed the experiment to which Sir Everard Home alludes, with nearly similar results. The only discrepancy which exists between us is, that the dog upon which I operated retained the power of voluntary motion entire until death; and the difference in the length of time between the operation and the fatal termination, Sir E. Home's case having proved fatal in five hours, and mine not until after the lapse of twenty-seven hours.

Saturday, 19th December 1840, at a quarter past three P. M. with the assistance of Dr Mercer, I injected 180 minims of the *Vinum Seminum Colchici* into the external jugular vein of a middle-sized dog. During the introduction of the fluid, its breathing was momentarily very much oppressed, owing, I presume, to the congestion produced by the entrance of the fluid into the right side of the heart. On being let loose, the animal endeavoured to make its escape from the room; the gait was perceptibly unsteady, and in the course of a minute it lay down on some straw in a corner, from which it could not be tempted to move. On being roused, however, it remained standing for a short time, but very soon again resumed the recumbent posture. The muscles were affected with a universal shivering; and on endeavouring to count the pulsations of the heart, these tremors simulated the contractions of this organ so completely that there was difficulty in distinguishing the one from the other. Pulse 112; inspirations 44 in the minute; the action of the heart fluttering and intermitting. During nearly an hour, no decided alteration took place; and at no time was any perceptible change observed on the pupil. At half-past six, about three hours after the operation, the dog had passed a large quantity of fœcal matter, some watery stools, and likewise a large quantity of a fluid resembling dark venous blood. A very considerable quantity of inky-coloured serous fluid had also been vomited. The poor animal was seated upon the hinder extremities, but, upon being roused, stood on its legs. Pulse 102, irregular and weaker; inspirations 42 in the minute. At half-past nine P. M. there was no very decided change since last report. On being roused, he had a very unsteady gait. The eyes were dull and glazed, and he had vomited large patches of a frothy fluid.

20th December, at half-past eight A. M., had passed throughout the night more stools resembling dark blood, and a quantity of the same fluid seems to have been ejected from the stomach. He had not touched food since the operation. Some frothy sputa were found in a plate which had been placed beside him, containing soup and meat. Could not be roused so as to stand up. Pulse weaker; 120 in the minute. At half-past four P. M. appeared more prostrated than at last report. The pulse was 150 in the minute, weak, thready, but not intermitting. Inspirations 32 in the minute. Remained much in the same state until seven o'clock, when he expired.

The body was examined at seven A. M. on the following day, twelve hours after death. The intestines were very much contracted. The inner surface of the stomach presented many more rugæ than natural, and was highly vascular. The whole course of the intestinal canal was of a deep-red colour, most intensely injected, and these appearances were better marked in the lower portion of the tube. In the colon were the same longitudinal striæ mentioned in the other case; and the whole tract of the canal was lined with mucus, intimately mixed with bloody serosity, similar to the fluid which had been evacuated. The gall-bladder and urinary bladder, as in the former case, contained a large quantity of their respective fluids. The kidneys were in a state of congestion, and the heart was in a state of hypertrophy, which, however, had evidently no connection with the administration of the medicine.

The whole intestinal tube, with the appearances which I have described, is deposited in the museum of the Royal College of Surgeons of Edinburgh.

My father published in 1837, in the forty-seventh volume of the Edinburgh Medical and Surgical Journal, (p. 345) a series of experiments instituted for the purpose of elucidating the action of this drug, and for regulating his practice as to the extent to which it might be prescribed with saftey. From the results of these experimental trials he discovered that more than 170 minims of the *Vinum Seminum Colchici* cannot, in general, be safely administered, in the course of twenty-four hours, to an adult; and that even this quantity, administered in doses of from fifty to sixty drops, at considerable intervals, is often more than advisable, as its cathartic and irritating effects on the mucous membrane of the stomach and alimentary canal were very violent. These results coincide exactly with my own experience, and satisfactorily prove that the directions given by many other writers are highly dangerous, and calculated to do much mischief.

Its principal effects, when administered in this manner, are impaired appetite, nausea, increased secretion of bile, depression of strength, increase of the cuticular exhalation, griping pain in the abdomen, copious watery alvine evacuations of a yellow colour, increased secretion and turbidity of urine, of which I shall speak more fully at a subsequent part of this paper. Colchicum also produces a direct influence on the action of the heart and arteries, and relieves pain in almost every part of the body; but more particularly in the joints. Before concluding the remarks which I have to make on the physiological part of our subject, I would observe, that colchicum is a medicine of such activity that it should never be given, except in minims. Indeed, Paulus Ægineta seems to have been aware of its violent action, as also of its great influence over some kinds of disease, as seen by the advice he gives with regard to the administration of hermodactyl, which, as will be shown afterwards, is a colchicum. " Sunt qui in omnibus articulariorum vitiorum accessionibus purgatione ex hermodactylis ipsis alvis sollicitaverint; sed attendendum est quoniam hermodactylus stomacho facessit negotium, anxietatem et cibi fastidium movet." A drachm dose, even to a patient who has been in the habit of taking this medicine, and who may have previously swallowed that quantity with impunity, or even advantage, ought not to be rashly prescribed, since colchicum produces very different effects, even on the same individual at different times, according to the state of the digestive organs, and probably of other circumstances with which we are not yet properly acquainted. In speaking of the administration of this drug, my father remarks, " From what I have observed I should conclude that there is most risk of danger from the violent action of any plant containing veratrine (and this is still more applicable to colchicia) in debilitated constitutions, particularly in individuals whose digestive organs are weakened by intemperance." This opinion I have repeatedly seen verified, and I am convinced that great caution is requisite in administering colchicum, when disease exists in any abdominal organ, as, from a comparatively small quantity being given in that condition of the system, intractable vomiting and purging are produced, accompanied by alarming depression of the vital powers. The following assertion of Dr Stokes, in his work on the Diagnosis and Treatment of Diseases of the Chest, in speaking of the tartrate of antimony, applies with even greater propriety to the exhibition of colchicum. " The more sthenic the disease, and the greater the exemptions from complications, especially with abdominal disease, the more safe and efficacious will be the remedy;" and the necessity of attending to these directions cannot be too strongly impressed on the minds of those who administer colchicum, as they involve a point of the utmost practical importance, the neglect of which cannot fail to be followed by the most disastrous consequences.

Notwithstanding the powerful effects which colchicum produces upon man and dogs, we find that it acts with very different degrees of energy upon other classes of animals. For the purpose of ascertaining precisely in what respects this action differs, I instituted the following experiments, which were performed with the utmost care, and are, therefore, I trust, exempt from any source of fallacy.

On the 7th December 1840, I gave a small rabbit half a drachm of the *Vinum Seminum Colchici.* It commenced eating immediately afterwards, and on the following day nothing unusual was observed, except that it appeared to have passed a larger quantity of urine than natural.

On the 8th, at six P. M., twenty-four hours after the last dose, one drachm was administered, and, with the exception of a diuretic effect, no particular change was observed.

On the 9th, no perceptible effect having resulted from yesterday's dose, at nine P.M., twenty-seven hours after the last experiment, two drachms more were swallowed, and no evident change was observed in the animal.

On the 10th, at six P. M., twenty-one hours after the last dose, three drachms more were given. After one drachm had been introduced, the rabbit began to squeak and to struggle violently; and upon being let loose, ran about as if in pain. The same effect followed after the exhibition of the second drachm, but after the third, it began to eat, and appeared quite as lively as usual.

Thus, to a very small animal, in the course of four days, six drachms and a half were given; more than six times the quantity which proved fatal, with the most violent symptoms, to a dog, with little effect except acting upon the kidneys.

To a larger rabbit, on the 7th, at six P. M., one drachm of the *Vinum Seminum Colchici* was given; and at the end of twenty-four hours no effect was perceptible. Twenty-four hours afterwards, at six P. M. two drachms more were administered without any marked change taking place. It did not begin to eat immediately afterwards, but on being put into its box, it soon did so, greedily.

At nine P. M. on the 9th, three drachms were administered without any decided effect.

On the 10th, at six P. M., the rabbit appeared to have been well purged, and to have voided a very large quantity of urine. It had, however, eaten the usual quantity of cabbage, and on giving it more, fed most heartily. Half an ounce of the wine of the seeds of colchicum was then given. Almost immediately afterwards, it passed a very unusually large quantity of urine, and an almost constant flow of this secretion continued for nearly half an hour afterwards. In every other respect he was as lively as ever.

On the 12th, no other effect having been produced from the last dose, seven drachms more were given. The same increased secretion of urine was observed, but in no other respect did this differ from the former experiment.

Thus, in this case, seventeen drachms were given in the course of six days, without any material change being produced on the animal, and when we consider the comparatively small quantity which in man and dogs produces the most deleterious consequences, we seem justified in arriving at the conclusion, that this medicine acts but feebly on the system of these herbivorous animals.

On the 16th, at six o'clock P. M., forty minims of the *Vinum Seminum Colchici* were administered to a large cock, which did not appear to have produced any effect on the following day.

On the 17th, at a quarter to ten P. M. increased the dose to eighty minims.

On the following day, it seemed to be languid, and a large quantity of watery evacuations had been passed throughout the night. The appetite was less than for some days past; the same quantity of oats not having been swallowed, and its crop was almost empty. At a quarter to six P. M. gave it 120 minims; offered considerable resistance to the introduction of the medicine; it threw up a considerable quantity of thin mucus, and soon afterwards passed a large quantity of a white watery evacuation *per anum.*

At half-past eight on the following morning, the bird appeared very weak and languid, had been purged throughout the night, the dejections being of the same kind as mentioned at last report. At nine P. M. had taken no food throughout the day; seemed very weak and lethargic. One hundred and eighty minims more were given; it offered less resistance than yesterday, and threw up some more mucus. On being placed upon the ground, seemed very feeble and almost unable to stand; being laid on its side or back, it remained quite motionless, making no attempt to regain the erect posture.

At nine A. M., on the 20th, was very feeble and weak; has taken no food throughout the night, and there is nothing in its crop; died at ten A. M.; slight spasms came on before death.

On laying open the abdomen immediately afterwards, the intestines were found very much contracted and vascular. In the stomach was found a small quantity of oats quite unchanged, along with a large mass of greenish half-digested matter. Close to the pyloric extremity of the duodenum, was a small dark red coloured patch; several others of which were observed along the whole course of this gut. In the upper part of the small intestines was a very vascular spot, extending around the whole circumference of the canal, from which a vascular line extended downwards in a longitudinal manner for a considerable distance, from which striæ of vessels shot out on each side. In the lower part of the bowel these appearances were still more distinct, and in some parts intestines were studded with livid spots of extravasated blood, resembling petechial eruptions, which in other places coalesced so as to form one continuous purple-coloured patch. The vascularity was much increased towards the extremity of the intestinal tube, so that the whole parietes of its canal were of one uniform red colour, intersected by longitudinal striæ of a deep red-hue; the separate streaks being united by a plexiform arrangement of vessels highly injected. In the whole extent of the intestines there was a large quantity of mucus mixed with half-digested food tinged of a green colour. The gall-bladder was very much distended with green bile; all other organs were healthy. In this case, 480 minims were administered to the animal in the course of four days, and the fatal termination did not supervene until the fifth day, presenting thus very different results from those obtained in the experiments on dogs, sufficiently proving, that the system of these animals is less susceptible of being acted on by colchicum than that of man and dogs, though much more so than that of rabbits.

The next animal which I subjected to experiment was a large frog. On Friday morning at ten A. M., 15 drops of *Vin. Sem. Colchci,* mixed with a little water, were injected into its stomach. Immediately afterwards it seemed inclined to vomit, the breathing appeared to be a good deal oppressed, and the inspirations amounted to 80 in the minute. At night it seemed completely recovered, and was as active and lively as ever.

On Saturday morning at nine A. M., when the animal was apparently in a natural state, forty drops of colchicum were injected into its stomach; immediately afterwards convulsive gulps were made, as if attempting to vomit. The respiration was disturbed and feeble, there being only thirty inspirations in the minute. The animal was very weak, and, instead of its usual sitting posture, squatted down on its belly. The inspirations gradually increased in frequency, and at one o'clock were 90 in the minute.

Sunday ten A. M. Seems more languid to day, although still abundantly active. Inspirations only 70 in the minute. Twenty-five minims of colchicum wine were given, immediately after which it made several convulsive gulps, and cleaned its tongue and mouth with its foot. It seemed much weaker, the inspirations being very irregular, and only 28 in the minute. At two P. M. the inspirations were weak and 100 in the minute.

At half-past three P. M. 30 minims more were administered; it appeared very languid immediately afterwards, and ejected from its mouth a quantity of fluid like saliva. At twenty minutes past eleven P. M. the inspirations were 110 in the minute; 30 minims more of colchicum wine were injected into the stomach, which at first appeared to occasion a slight degree of excitement, five minutes after which it remained in a somewhat fixed and rigid state. Respiration slow and irregular. After the lapse of ten minutes still remained in the same rigid state, with the head erect and the eyeballs exceedingly protruded. Respiration for half-a minute together, not perceptible. After the lapse of fifteen minutes the inspirations were 46 in the minute. Twenty minutes after the colchicum had been given, a quantity of a fluid like saliva issued slowly from its mouth. The respiration was slow and irregular; a peculiar motion was observed in the hinder legs, as if arising from irritation in the internal and lower parts of the body, there appeared less rigidity of the muscles, and it seemed more inclined to squat.

Monday nine A. M. Gave it thirty minims more of the *Vinum Colchici*; the same effects were produced as described yesterday morning. At seven P. M. forty minims more were given. It seemed languid immediately afterwards, and the respiration was impeded for some time afterwards, being occasionally imperceptible for half-a minute at a time.

On Tuesday, twelve o'clock noon, forty minims more of the *Vinum Seminum Colchici*. Seemed more languid than upon any former occasion; lies quite prostrate upon its belly, and for upwards of a minute no sensible breathing was observed.

At eleven P. M. forty drops more were given, and the effects that followed corresponded exactly with those observed after this morning's dose.

On Wednesday at two o'clock P. M. sixty minims were injected into the stomach, and thirty were at the same time introduced into the rectum by the anus. The appearances observed after these experiments were exactly the same, though perhaps more marked, than on former occasions, and at the end of 48 hours the animal seemed to be in exactly the same condition as before the commencement of the experiments.

In this case, in the course of six days, 350 minims were administered with comparatively very slight effects being produced, and which might very well be attributed to the quantity of wine swallowed. At all events, I conceive this experiment amply demonstrates that the action of colchicum on frogs differs widely from the effects produced on man and dogs.

Desirous of ascertaining the effects of colchicum on fishes, I recently made the following experiment.

Thirty minims of the meadow saffron wine were injected into the stomach of a well-grown gold-fish, weighing about one ounce, without any sensible effects being produced, except causing a copious discharge from the bowels, consisting apparently of the natural excrementitious evacuations with a quantity of mucus.

Not being able to procure a carnivorous animal, owing to the season of the year, I subjected to experiment a sea-gull, which had been slightly wounded in the wing. Thirty minims of the *Vin. Sem. Colchici* were injected into its stomach at ten P. M. No very decided effects were observed during the following hour. On being visited next morning at seven o'clock, it was found quite dead, cold and stiff. On examination after death, the intestines were found much contracted and vascular, containing a large quantity of pulpy fluid. The alvine evacuations had not been profuse, but were very fluid.

From the result of the investigations detailed above, it appears that we are warranted in concluding, that the action of *Colchicum Autumnale* is most decided upon carnivorous and omnivorous animals, while its action on herbivorous, graminivorous, and cold-blooded animals is comparatively feeble.

Having concluded my observations on the physiological action which colchicum produces on man, and on some of the lower animals, I proceed to speak of its therapeutical effects when administered in disease. In the first place, I shall consider its effects and mode of action in gout, a malady over which, as is almost universally believed, it exerts a decided influence.

Colchicum owes its virtues to colchicia, an alkaloid, which in its general character resembles veratrine, the active ingredients in *Veratrum album*; indeed, so similar are those alkaloids in their properties, that, until lately, they have been held to be identical. It was well known to the ancients, that several plants, which the researches of modern chemistry have ascertained to contain veratrine, or colchicia, possessed powerful anti-arthritic virtues. Aretæus appears to have placed his chief dependence on hellebore in gout; and Pliny makes particular mention of this medicine, as being an antidote to that formidable disease. Veratria or colchicia were likewise the active ingredients in most of the empirical remedies, which in all ages have been lauded for the cure of this class of complaints. "Conradus Gesnerius," says Bergius, "medicus quondam candidus pariter ac doctus Helleborum album antimonio longe antehabuit et passim in epistolis suis ampliter eum laudavit. Sumsit ipse aliisque propinavit Helleborum, et dicit se nunquam usus ejus pænituisse. Addit semel creberrime Helleborum usum esse non ad purgandum sed ad reserendos meatus et crassos humores attenuandum, eosque a centro et interioribus corporis ad superficiem et vias excretionum variarum educendum. Recreat et roborat et hilariorem facit et acuit ingenium quod in me et aliis saepissime expertus scribo. Sed tenendus est modus. Semper in forma liquida adhibuit Helleborum." It was believed on very strong grounds that the celebrated *Eau Medicinale* d'Husson consisted of a vinous tincture of white hellebore or colchicum, and opium;* but what is of still more importance to our present inquiry, it was discovered a few years after the *Eau Medicinale* had been used in this country, that a vinous tincture of *Colchicum Autumnale* had the same or superior virtues, and is unquestionably a more manageable, and less dangerous medicine, than one containing hellebore in its composition.

Alexander Trallian, in the fourth century, ascribed effects similar to those produced by colchicum, to a medicine called hermodactylus, which at one period was very extensively employed by the Arabian physicians, by Paracelsus, Crollius, Turner, and others. Paulus Ægineta mentions that hermodactylus proved very successful in the treatment of gout, although he disapproves of its administration, for the reason mentioned in a former part of this paper, "quoniam stomacho facessit negotium, anxietatem et cibi fastidium movet." In the twelfth edition of Quincy's Dispensatory, published in 1749, we have a very interesting account of that medicine, under the more modern name of the *Colchicum radice siccata alba*, where it is much lauded for its efficacy in arthritic affections.

Prosper Alpinus maintained the identity of hermodactyl and colchicum; and Sir Gilbert Blane, in his work on Medical Logic, shows that this is highly probable; and justly remarks, that, in establishing the identity of these plants, we have an example of a most valuable piece of knowledge, lost to the world for many ages, from a want of a description of the article, which on that account could not be recognized from one age and country to another. And we see what incalculable advantage must result to medicine in general, from the cultivation of natural knowledge, from this consideration; an advantage peculiar to the present age; for never till now have the various objects of natural history, particularly of botany, been so described, that in all ages to come, however remote, no ambiguity can arise, regarding the identity of the remedies recommended among the medical practitioners of this or any other future age.

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* See Moore on the composition of the Eau Medicinale d'Husson. London, 1811; and in the Edinburgh Medical and Surgical Journal, Vol. vii. p. 449.

That hellebore and colchicum possess similar medical virtues, there can be little doubt; but the active principle of the latter certainly differs from veratria, upon which alkaloid the medicinal virtues of hellebore depend. From not attending to this distinction, my father has fallen into error in the comments which he has made upon the aphorisms of Hippocrates, who enumerates convulsions as one of the worst symptoms induced by hellebore. Under the impression that colchicum owes its activity to veratrine, he concluded that when hellebore did mischief, it was not by occasioning convulsions, but by giving rise to inflammation of the bowels, producing diarrhœa, or, in fact, cholera; but that hellebore produces effects peculiar to itself, and differing from those of the meadow-saffron, is manifested by the following experiments on rabbits, animals, as we have seen above, which are very slightly affected by the administration of very large doses of colchicum wine.

On the 14th December 1840, at six P. M. half-a-drachm of the tincture of white hellebore was administered to a small rabbit. It appeared to make greater resistance to the introduction of the fluid than in the former experiments with colchicum, which might partly be owing to the greater bitterness of the hellebore. After being placed in a box, it passed a considerable quantity of urine; no other effect was perceptible.

On the 15th, at nine A. M., no decided effect having been produced from yesterday's dose, one drachm more was administered. During the administration of the tincture, it began to squeak. Immediately after the whole drachm was given, it panted, gasped, and fell to the ground, dying almost instantaneously in the most violent convulsions.

To a larger rabbit, on the 14th December, at six P. M., one drachm of the tincture of white hellebore was given without any very evident result.

On the 15th, at nine A. M., two drachms more were given, which made it very sick, much less food being eaten during the following twenty-four hours than on any former day.

On the 16th, at six P. M. thirty-three hours after the last dose, three drachms were administered; several convulsive gulps were made, the immediate consequence. The animal was very inactive during the remainder of the evening; but on the following morning, seemed considerably better, and had eaten some food during the night. No diuretic effect had been produced.

At half-past nine P. M. on the 17th, three drachms more were administered. After two drachms had been injected into the stomach, the rabbit began to squeak and to struggle violently. Upon being placed on the ground, it staggered, seemingly in great distress, gasping and making a sharp croaking noise. After the third drachm was taken, it discharged from the mouth about one drachm and a-half of clear fluid like saliva. The breathing became spasmodic; and in about a minute it fell down in severe convulsions, which continued with great violence for about half a-minute, when the animal expired.

In both these cases the chest and abdomen were laid open immediately after death; the peristaltic movements of the bowels were remarkably feeble, and soon ceased. All the organs in these cavities perfectly healthy.

But to return to the therapeutical action of colchicum. The *Pulvis Diaturpethi* and Turner's powder, at one time so celebrated in the cure of gout, now little heard of, and scarcely known, were, I have no doubt, frequently used with advantage, and owed their medicinal virtues to the hermodactyls which each of these once famous medicines contained; whilst the *Aqua Arthritica* of the Augustan Dispensatory, as well as the famous Portland powder, and the *Pulvis Arthriticus Amarus* of the Paris pharmacopœia, owe, I believe, the power which they assuredly possess of relieving arthritic pains and swellings to the ground-pine (Chamæpityos) which enter into their composition,—a plant which probably contains one or two of these alkaloids. It is interesting to observe the language of early medical writers in regard to the effect of the medicine of which we have just been speaking; and of others which contain these substances in their composition. Such were reported to be very efficacious in "rooting out and destroying the matter in the joints, which is supposed to cause those vehement pains, swellings, and sometimes chalky indurations"—language arising from their ignorance of physiology and imperfect pathology. The "scouring and preserving from the lodgement of gritty matters" was really a description of what actually occurred; and which the light of modern physiology has shown to arise from the power, which some at least of the remedies mentioned possess of controlling arthritic inflammation, and consequently preventing calcareous depositions.

The power which colchicum possesses of alleviating the agonizing symptoms of gout is so unquestionable, that I conceive it unnecessary to occupy time in narrating particular cases of its efficacy.

The *modus operandi*, however, of this potent drug, demands upon the present occasion our special attention; and it behoves us to consider the question as to the safety of its internal exhibition.

As surmised by physicians in all ages, it is, I apprehend, by acting on the fluids, and especially on the blood, that we can really reach the *materies morbi* in arthritic and rheumatic affections. It were vain to advert to the erroneous opinions of the ancients, as to the peculiar morbid humours from which they conceived gout to arise; but the modern opinion of an excess of uric acid or of urea in the blood being, if not the proximate cause, at least mainly instrumental in constituting the disease, appears to be very probable, and to be confirmed by phenomena observed during its continuance, and by the effect of remedies which are efficacious in relieving it. In the present state of our knowledge, at least, we must, in considering the indications of cure, take into consideration all the elements obviously forming the constitutional and local affections present in gout, namely, vascular plethora, topical or general; gastric, hepatic, and intestinal derangement, as well as impaired and exhausted nervous energy; but a careful consideration of all the phenomena as they occur in gout, would, I humbly conceive, lead to the conclusion, that in this disease the fluids of the body are primarily affected; that, in short, gout is a disease of the blood, and that a vitiated condition of this vital fluid is the first link in the chain; and that the deranged state of the organic system of nerves and its consequences are merely secondary, and dependent on the former.

If this view of the pathology of gout be correct, we need be at no loss to account for the astonishing efficacy which colchicum possesses of relieving this disease, as we find, by the experiments of my esteemed friend, Professor Chelius of Heidelberg, that the quantity of uric acid excreted by the kidneys is nearly doubled in the course of twelve days under the use of this remedy. The opinions of this learned Professor with reference to this subject are stated in the following letter, which I had lately the honour to receive from him,

" Monsieur, *Heidelberg*, 10*th Decembre* 1840.

C'est avec plaisir, que je reponds à votre lettre, et que je vous donne mon opinion sur l'action du colchicum. Des experiences repetées m'ont prouvé, que pendant l'usage de cette drogue la quantité de l'acide urique eté sensiblement augmenteé dans l'urine, et j'ai publié le resultat de ces experiences dans les 3me vol. des Annales Cliniques de Heidelberg. Cette drogue produit lentement le même changement dans les affections goutteuses ou rhumatismales, que nous voyons s'effectuer plus subitement par les crises dans ces affections, c'est-a-dire, une evacuation plus copieuse de l'acide urique. Par cet effet on peut clairement demontrer l'action salutaire et quelquefois suprenante de ce remede dans la goutte, et c'est aussi pour cela que je me sers presque exclusivement de ce remede dans cette maladie, comme dans les affections rhumatismales. Jamais je n'en ai vu des effets nuisibles.

" Je suis bien curieux du resultat que vous obtiendrez par vos experiences sur ce remede et vous m'obligerez bien en voulant me le communiquer,

" Agreez l'assurance de ma consideration parfaite.

(Signed) Dr Chelius."

The accuracy of these remarks with reference to the increased quantity of uric acid excreted by the kidneys during the administration of colchicum, have been confirmed in a great variety of cases which have fallen under my own observation, the following of which I subjoin as peculiarly calculated to exemplify the correctness of these views.

On Thursday, 12th November, Mr A. B., aged 48, of a gouty diathesis, after a debauch, in which he had indulged in champaigne and different wines, felt very unwell during the next two days; he complained of slight headach, gastric derangement, and flying pains. His urine was also very turbid and of high specific gravity. At the end of three days felt rather better, but still remained uncomfortable on the 15th and 16th, although he was rather better on the 17th. Urine on that day much less turbid, and its specific gravity 1020. On the 18th felt very ill. The urine voided in the forenoon of this day of a light yellow colour, its specific gravity being only 1014. At half-past five P. M. took 40 minims of the *Vinum Seminum Colchici*, and again, at half-past eleven, 40 minims more. Had not tasted animal food during the day, and nothing since two o'clock. Passed a restless night, suffering from griping pains in the abdomen. Vomited early on the following morning, 19th November, and frequently in the course of the forenoon. Urine turbid, and in appearance like lime suspended in water. Two ounces of this urine required three drachms of nitric acid to render it transparent. The patient remained feverish, ill, and unfit for exertion of any kind. Bowels moved twelve times in the course of the day, the evacuations being at first of a bright yellow colour, and of a peculiar cheesy odour. By degrees they became lighter, and by nine o'clock P. M. were almost colourless, and without odour. At bed-time, pediluvium was employed, and two glassfuls of mulled wine were taken. Slept well, and on the following morning felt greatly relieved.

On the 20th November, urine very turbid, and three drachms of nitric acid were still required to render two ounces of this fluid transparent. Specific gravity 1034.

November 21st. Feels still more relieved; urine, when voided in the morning, quite clear; at mid-day, however, it had become quite turbid, and its specific gravity was 1030. Dined early on roasted pheasant; took no wine; but drank a pint of porter. At six o'clock P. M. voided urine, which on cooling was less turbid, and in density 1021.

November 22, Felt in his usual state of health; urine natural in appearance, and its specific gravity 1013.

Conceiving it to be of importance, in this case, to have an accurate analysis of the urine, specimens of it voided on the 17th, 19th, and 20th, were sent to Dr Christison, our highly distinguished Professor of Materia Medica, who had the goodness to analyse it, and report as follows.

" I examined the three specimens of urine. No date of the first I have now got, but I think it was November 17th; but at any rate I understand that it was passed before the patient had taken any colchicum. There was no deposit of lithate of ammonia in it; its density was 1020; it contained above forty-seven parts of solid matter in 1000, and of this quantity twenty parts were urea. The two specimens marked as passed on the 19th and 20th November were exactly alike. They were very turbid, and the turbidity disappeared with a gentle heat. The deposit was evidently lithate of ammonia. The density of the first was 1033.5, and that of the second 1034, which are both very unusually high for urine not diabetic. As they were obviously identical in their nature, I only analysed the second. It contained 79 parts of solid matter in 1000, and of this quantity 35 were urea. I suspect now that the proportion of urea was even greater; for, having occasion the other day to refresh my memory as to the process I usually followed for ascertaining the quantity of this principle in urine, I find that, in analysing that which you sent, I had not used so large a proportion of nitric acid as I ought to have done. Now, nitrate of urea is soluble in water, but is rendered insoluble by a large excess of nitric acid; so that, if there was not a large excess, I could not have obtained all the nitrate of urea which was formed, because some of it would remain in solution. Even the proportion I did obtain is considerably above the standard of health."

I have only to direct attention to the quantity of urea contained in the urine on the 17th, before any colchicum had been prescribed, with that passed on the 20th, after its administration, to show that the quantity of urea was nearly doubled, which coincides precisely with the views entertained by Professor Chelius of Heidelberg.

Mr A. B. was again taken ill on Tuesday night, 29th December 1840, having been subjected to great anxiety and considerable mental irritation, and afterwards exposed for some time to severe cold. He was suddenly affected with confusion in the head; an uneasy feeling in the region of the heart, with palpitation; acute pain in the right side of the neck, from the angle of the jaw to the junction of the sternum and clavicle, with smart flying pains in the wrists and ankles. I did not see him till a considerable time had elapsed after the seizure. He was then in bed, and had somewhat recovered from the cerebral and cardiac symptoms; but the pains in the back, throat, wrists, and ankles were still violent. Pulse 120; respiration natural; tongue slightly furred. It was to us a matter of serious consideration, whether or not blood-letting should be had recourse to; but, as the symptoms were less urgent than they had previously been, and as the patient himself was averse to that remedy being employed, it was not insisted on, we left him about midnight, with strict injunctions to his friends to call us in the event of his situation appearing to require assistance.

Wednesday morning. Has passed a very disturbed night, having suffered much from the pains in the limbs, neck, and integuments of the head. The pulse, it appears, had been rapid throughout the night, beating, by his own report, upwards of 100 in the minute; now it is 90. The pained parts were ordered to be rubbed with an embrocation, consisting of the *Liq. Ammoniæ fort.* and tincture of camphor, with spirit of rosemary. Has voided a great quantity of urine, which is very colourless, and of specific gravity 1009. Two colocynth pills were ordered to be taken, with a little extract of hyoscyamus.

Half-past one P. M., nearly as at last report. The bowels have not been moved. *Habeat Haust. Salin. cum Vin. Colchici.* M. xl. *Sig. Mox sumendus.*

7 P. M. Has experienced great relief since last visit. Bowels have not been moved, but the urine has been plentifully voided, which is excessively turbid, and was found to be of specific gravity 1033. Has no appetite for food, and has taken nothing to-day.

10 o'clock P. M. Continues better. Bowels have been moved;

feels now a great craving for food for the first time since he was taken ill, and expresses a desire to take an egg and a little mulled wine, which he has found to agree with him under similar circumstances.

Thursday morning, is to-day almost quite well, but feels a little languid; pulse 72; tongue clean; bowels open; urine still very turbid, specific gravity 1034.

The gentleman who is the subject of the foregoing report is an individual of high intelligence and acute observation, and, from ample experience, fully competent to form an opinion of the comparative merits of different modes of treatment, as applicable to his own case. He has long been sensible that the state of his health is in some way connected with the condition of his urinary discharge, and is aware that derangement of health is the immediate consequence of any want in the due action of the kidneys, being fully satisfied that the state of his health is improved when deposits take place in his urine; and the practice adopted on the late occasion, to which I have referred, was in conformity with his own views. "Prescribe," says he, "for me a medicine that will occasion the excretion of the noxious matter in the blood by the kidneys, and I know that I shall experience relief." It was under these circumstances that colchicum was prescribed, and it was with very great interest that we watched its operation during the day. As was before stated, the medicine was taken at one P. M., and at four the urine was voided for the first time, which at first presented no unusual appearance, but upon cooling it became turbid, and when it had fallen to the temperature of 40°, it was as turbid, perhaps, as we had ever observed urine, and of specific gravity 1033. In the morning it had been of the specific gravity 1009. With the exception of some chicken-broth and tea, no other food had been taken throughout the day. As stated above, the relief which the patient obtained was coincident with the change in the urine. He improved every hour afterwards, and by two o'clock was able to leave his room, and enter upon the discharge of duties requiring exertions both of mind and body, with his usual alacrity. His own opinion, founded on much experience of his own case, is, that unless for the effect produced by the colchicum, he must have been confined for a week at least, and undergone severe medical discipline, as upon many former occasions, in the way of starvation, purgation, a *quantum sufficit* of sudorific medicines, and probably a bleeding from the arm.

Mr A. B. voided urine again at five o'clock, not in large quantity, which by mistake was removed, so that there was no opportunity of ascertaining its appearance or density; again at bed-time, and a third time this morning, (January 1st), which, on cooling, was excessively turbid, and in density 1037, a portion of which has been sent to the laboratory in the College of the Professor of Materia Medica for analysis.

With the exception of a small quantity of urine, which was passed when at the water-closet, this forenoon, none was voided until half-past eight o'clock, P. M., which, at nine, was found to be still turbid, but less so than the morning's. Specific gravity 1034.

I am indebted to my honoured friend, Dr Christison, for an analysis of Mr A. B.'s urine, referred to above, after the administration of colchicum. The learned Professor reported as follows: "The density is the highest I ever met with in urine not diabetic, namely, 1036. Suspecting there might be some sugar, I tried that point very carefully, and there is not a particle present. The turbidity is owing to lithate of ammonia, which is in excess, though not very much so. The specimen seems to me to be nothing else than urine loaded excessively with its ordinary soluble ingredients. The urea, in particular, is unusually abundant, for when one part of nitric acid and two parts of urine were mixed together, the whole liquid became a mass of pulpy crystals when cooled down to about 45° F. I am endeavouring to ascertain the actual proportion, but I fear I have committed a mistake. Not being satisfied with the common process, which I think cannot separate the whole urea, I tried another method, which seemed to me to promise better, but, on the contrary, it is worse; at least I have not obtained from concentrated urine with nitric acid, the firm, pulpy mass which I think I ought to have got, considering the very unusual amount of crystallization caused by nitric acid in unconcentrated urine."

In further illustration, I beg to subjoin the following remarks of Dr Prout in his excellent work On the Nature and Treatment of Stomach and Urinary diseases. "Whoever has attended much to urinary diseases must have remarked, that many individuals subject to derangements of the general health, seldom feel so well with respect to their health as when lithic acid deposits take place in the urine;" and at page 227, he makes the following remarks:—We have said, that about the age of 40, the lithic acid may occasionally be considered as a sort of *materies morbi*, that is, the cause of irritation in the constitution, whatever it may be, is transferred to the kidneys, which are induced to secrete an extraordinary quantity of lithic acid, and thus to meliorate the system in general. On a similar principle, the good effects long ascribed to certain remedies of the active diuretic kind, may probably be explained: such remedies appearing to possess the power, when given in favourable conditions of the system, of exciting the kidneys to separate large quantities of lithic acid; and in this way, by bringing about an artificial crisis, to produce great and immediate benefit. Thus Dr Henry has mentioned cases in which *several ounces* of lithic acid were brought away in the course of a day or two by a remedy apparently composed of turpentine and laudanum chiefly."

Another circumstance tending to render this opinion probable is the fact now ascertained, that tofi or gouty chalk-stones do not consist, as was formerly supposed, of phosphate, but of urate of lime. Alkalis and other antacids have a most decided effect in diminishing the formation of urea; and, as is well known, are among the most useful medicines we can employ as prophylactics in arthritic habits of body; and before concluding, I may remark, that, if these views be correct, we must, in the systematic treatment of gout, principally direct our attention to the counteraction of its cause, an excess of urea in the blood, which can be accomplished most readily, as above demonstrated, by the internal administration of *Colchicum Autumnale.*

Independent, however, of this effect, to which I am inclined to attribute much importance, we can easily understand, from a knowledge of its physiological action on the stomach, intestinal canal, liver, skin, and circulating system, the beneficial results it must produce in a disease characterized by the symptoms observed in gout.

Extraordinary and valuable as colchicum undoubtedly is as a remedy in paroxysms of acute gout, it is perhaps almost more so in the irregular forms of that dangerous and distressing disease, especially in affections of the heart and large blood-vessels, which are so apt to occur in persons of a gouty diathesis. As a student of medicine, I had frequently an opportunity of witnessing in the practice of my father, who has long made the medicinal properties of this drug a particular study, cases which, with others I have more recently seen, strongly corroborates the accuracy of this opinion; and I quote from his note-book the following case, which produced at the time on my mind a most favourable impression of the benefit to be derived from this medicine in these forms of disease.

April 7th 1836, Mr C. D., aged 67, of a gouty habit of body, has been subject to palpitation of the heart for eighteen months past, which have gradually been becoming worse, with severe cramps in the legs, of which he complains much, and during the last ten years has voided fusiform lithic concretions in large numbers, varying in size from a pin's head to a small cherry-stone. The feet had been tender lately, and the ball of the toe was slightly inflamed. The action of the heart was very irregular, as also the pulse at the wrist, which was in frequency 92 in the minute. For a considerable period past, he has been living comparatively in a very abstemious manner, and been taking a small dose of rhubarb and magnesia every morning, without much or any sensible effect. *Vini Sem. Colchici*, ℥ss. Sig. twenty drops three times a-day in water.

April 10th. Has been taking the medicine regularly as directed. Experienced a slight degree of nausea during the whole of yesterday afternoon, and in the evening felt considerable commotion in the bowels. Had two watery stools before going to bed, and five this morning. The heart's action was much less violent in the night than it has been for many nights previously; pulse fuller and more regular, in number 76. Omit *Vinum Colchici.*

12th April. As at last report. Bowels still open; pulse, 72. By Mrs C.'s report, the action of her husband's heart during the night was less violent than it was wont to be.

14th April. In every respect the same as on the 12th, except that the bowels are not so open. *Reptr. Vinum Colchici in dosibus viginti quinque vel triginti guttarum ter in die.*

18th April. Has been using the medicine as directed since last report, which acts upon the bowels, but not violently. The action of the heart and pulse greatly improved when compared with their condition on the 7th, but both still decidedly abnormal. *Continuetur Vinum Colchici.*

27th April. Has been taking of late from twenty to thirty drops of the *Vinum Colchici* daily. Bowels generally moved twice or three times in the course of twenty-four hours. No sickness produced by that quantity. Has taken in all half an ounce of the colchicum wine in twenty days. Action of the heart has become much more regular, with a corresponding improvement of the pulse. Has got completely rid of the cramp since he began to use the medicine. *Continuetur Vinum Sem. Colchici* in such quantities as to act sensibly but gently on the bowels.

May 5th. Has taken from twenty to thirty-five drops daily, which moved the bowels twice and sometimes three times a-day. The pulse is decidedly improved in character. The irregularity of the heart's action still perceptible, but much less so than formerly, and regular professional attendance was considered unnecessary. From that date he continued to use the colchicum, occasionally, in small doses for six months afterwards, so as to act gently on the bowels, with great relief to the cardiac affection. The number of urinary calculi passed was much less than formerly, and he was never again troubled with cramps.

This patient died of apoplexy eighteen months afterwards, and the following is a report of the *post mortem* appearances drawn up by my respected friend, Dr Handyside, one of our most accomplished anatomists.

" The viscera of the thorax, with the exception of the *heart,* were healthy. This organ was a little larger than natural, particularly its ventricular portion. Its surface was covered to a greater extent than natural with dense fat, and its lining membrane presented a uniform darkish mahogany hue. The right fold of the mitral valve was much thickened, and contained broad calcareous depositions, —appearances of which the arch of the aorta largely partook.

" The *gall-bladder* contained four or five small rough calculi mixed with viscid dark-coloured bile. The kidnies were each enclosed in about a pound and a-half of dense fat, into which texture the *papillæ renales* were converted. The pelvis of the kidnies were obliterated, and the ureters smaller in calibre, and thinner in texture than usual. The bladder was healthy, and in its texture quite healthy.

" On opening the head, much dark-coloured fluid blood was seen to escape, partly from the divided membranes, which were turgid with blood, and partly from a large cavity within the interior lobe of the left hemisphere of the brain.

" The substance of this last named organ was in every respect healthy, with the exceptions, first, of two cysts within the right *thalamus nervi optici,* one the size of a plumstone, the other, that of a split-pea, containing each of them a straw-coloured lymph, and the delicate membranous walls of which were lined by large turgid veins; and secondly, the presence of a cavity underneath and partly in the texture of the left *thalamus* and *corpus striatum,* which contained a clot of dark-coloured blood, the size of a nutmeg, partly flocculent and free on its surface, partly adherent to the parietes of this cavity."

The above case certainly appears to afford a striking example of the excellent effects of colchicum when judiciously administered.

From the history of the disease,—from the gradual but steady increase of the symptoms previous to the use of this medicine,—from the rapid amelioration which took place during its administration,—and from the appearances observed on dissection, we may, I conceive, legitimately conclude, that, had this remedy not been employed, more confirmed disease of the heart must have been formed; which would sooner or later have proved fatal; whereas, under the controlling influence of colchicum we find the progress of the organic affection arrested, and the patient ultimately die of a disease totally unconnected with the one for which the remedy had been prescribed. We find colchicum, likewise, apparently preventing in this instance the tendency to the formation of lithic depositions.

The following statement of a case from Dr Abercrombie's Pathological and Practical Researches on Diseases of the Stomach, and Intestinal Canal, the Liver and other Viscera of the Abdomen, is applicable likewise to my present purpose, in as far as it tends most admirably to illustrate the efficacy of colchicum in that class of diseases to which our attention is at present directed. " A gentleman, aged 48, in November 1825, began to be affected with paroxysms of palpitation of the heart and intermission of the pulse. They attacked him daily, sometimes twice or three times a-day, and generally continued about an hour at each time, and they were occasionally accompanied with a considerable degree of dyspnœa. During the intervals, the pulse was calm and regular, and the action of the heart quite natural. The period of the attack was generally soon after meals; but it likewise occurred at various other times; sometimes on first getting up in the morning, and sometimes during the night. During the paroxysms he could take walking exercise without increasing the symptoms. His digestion was imperfect, and his stomach easily disordered; his bowels were rather slow, and the motions were dark and unhealthy. A great variety of treatment and every possible variety of diet were employed with very little benefit. He went to London and then to Cheltenham, where much treatment was again had recourse to with little effect. He sometimes lost greatly in flesh and strength, and sometimes improved again; his digestion was sometimes better and sometimes worse; but, amid all these changes, the affection of the heart continued in the same form, namely, paroxysms of violent palpitation of about an hour's duration; occurring once or twice every day, and at no stated hours. After the affection had continued in this manner for two years and a-half, it subsided at last under the use of the colchicum wine, in very moderate doses. I do not attempt to account for the action of the remedy in this singular case; it acted at first strongly as a purgative, so that he was only able to take ten drops of the wine twice a-day. The patient's own account of the effect of it is in these words: " At the time of commencing the use of the colchicum, I had once, at least, every day, a severe fit of palpitation of an hour's duration; often two, and sometimes three fits in a day. So immediate was the effect of the colchicum, that, with the exception of the first and third day after beginning its use, I have not had a single paroxysm of the palpitation." He adds, that he continued the use of it for a month, and then left it off entirely; and that the quantity did not in general exceed from fifteen to twenty drops in a day."

In other forms of metastatic gout, when it affects the head, stomach, or intestines, and in most internal affections occurring either in the gouty diathesis, or upon the sudden disappearance of the external disorder, as well as in other anomalous affections, which this protean disease often assumes, we may expect relief to result from the proper administration of colchicum, as we have seen to follow its employment in the acute and more evident forms of arthritic disease; and as I conceive its mode of action in these cases, as also in rheumatism, to be precisely similar to that of which we have just been speaking, I shall now examine its effects in other diseases in which it has been less frequently employed.

From the powerful physiological effects which we have seen colchicum capable of producing, we might reasonably expect that it will be a powerful therapeutical agent in most diseases, where excessive excitement of the vascular and nervous system prevails; an opinion which has been entertained and insisted on by Mr Want, Mr Haden, my father, and others. The latter published in 1837, cases of continued fever, in illustration of his views as to the efficacy of *Colchicum Autumnale;* and concludes that, by its judicious administration, we may break the force of fever more effectually than by any other known means.

From my own experience, I am inclined to think well of the efficacy of colchicum in fever, and, as an example of the manner in which it may be used advantageously in that disease, I may record the following case.

Mrs L. aged 26, at present pregnant, had attended her mother lately when in typhous fever; she shivered on the 18th December, was affected subsequently with headach, pain in the back and limbs; at present, (December 22d) labouring under all the symptoms of fever in an aggravated form, severe headach, great prostration of strength, heat of surface, tongue covered with a thick white fur, pulse 136; has taken several aperient pills with little effect.

℞. *Vini Sem. Colchici.; Vin. Antimonii aa* ʒii.; *Spirit. Etheris Nitrosi* ʒii.; *Aq. Fontis* ʒiv. M. Sig. Two teaspoonfuls immediately, and one every three hours afterwards.

December 23d. The medicine was finished at seven o'clock this morning, she having taken it oftener than directed; has vomited frequently, and the bowels have been repeatedly moved; pulse 120; tongue much cleaner.

December 24th. Has been distressed with nausea and vomiting during the night, which continues until now (half-past ten A. M.); bowels had not been moved; pulse 122; headach very severe; specific gravity of the urine 1026. *Habeat Extracti Opii, Calomel.*

*aa* gr. i. *pil. ft.* *Sig.* to be taken immediately. 10 P. M. Took the above pill, and another grain of opium at five P. M.; feels now relieved.

℞. *Liquoris Opii Sedantis* gtts. xxv.; *Aq. Menthae Pip.* ℥ss. M. Sig. To be taken at bed-time.

December 25th, *mane.* Slept pretty well, but the headach still continued severe; tongue cleaner; pulse 120; specific gravity of the urine 1025. P. M. Has been greatly distressed with retching and vomiting since last report.

℞. *Creosoti* gtt. i.; *Syrup. Rosar.* ʒii.; *Aq. Menth. Pip.* ℥ss. M. Sig. To be taken immediately.

*Vespere.* Has vomited less frequently since she took the creozote draught; pulse 120; headach still very violent; tongue and other symptoms as at last report.

26th December, 12 noon. Vomiting returned violently since eight o'clock this morning. In other respects as at last visit.

℞. *Kreosoti* gtts. ii.; *Liq. Opii. Sed.* gtts. xv.; *Syrup. Rosarum* ʒii. *Aq. Menthae Pip.* ʒv. *M. Haustus ft.* *Sig.* To be taken immediately.

*Vespere.* Has vomited little since last report; pulse 120; in every other respect as in the morning.

27th December. Slept some hours last night; irritability of stomach entirely gone; tongue cleaner; pulse small, and more compressible; bowels not moved for two days past. To have a domestic enema.

*Vespere.* The injection operated satisfactorily; pulse still smaller, and more compressible. *Habeat statim Vini Rubri* ℥i.

28th December. Has had comparatively a good night's rest, but still a little headach; in other respects as yesterday; feels very anxious to enjoy sleep.

℞. *Pulv. Doveri* gr. v.; *Carb. Magnes.* gr. vi.; *Pulv. Rhei,* gr. iii.; *Min. pulv.* iii. *divide. Sig.* One every three hours; *et continuetur Vini.* ℥i. *quaque hora quarta.*

11 P. M. Has been tolerably easy all day, although she has had no sleep; pulse 120; tongue very clean.

℞. *Extracti Opii* gr. i. *pil. ft.* *Sig.* To be taken at bed-time, and the wine to be continued.

December 29th. Has had a good night, but the irritability of stomach to a certain extent still continues; has occasionally retched slightly, and vomited once; headach entirely gone; pulse 104; no motion in the bowels; had taken a cupful of beef-tea prepared for her mother before she was visited to-day; tongue cleaner. *Continr. Vinum, et reptr. enema.*

30th December. Has felt rather worse and more restless, with increase of headach and slight delirium since last visit, which she attributes to having taken the beef-tea; pulse 106; enema operated but very imperfectly; tongue as at last report. *Rept. Enema et habeat Pulv. Doveri* gr. v. *hora somni.*

31st. Enema operated well, and she feels better. *Habeat Pil. Opiat. h. s.*

1st January 1840. Slept well last night; headach quite relieved; pulse 100; stomach slightly irritable, but she may be reported perfectly safe, if not quite convalescent; and from this date she advanced rapidly to her accustomed state of robust health.

I venture not to decide whether the benefit which in this case, and in many similar which have come under my observation, was derived from colchicum, is to be attributed merely to its action as a purgative and emetic; but I think it not unreasonable to suppose, that the effect which we have endeavoured to prove is produced by colchicum in the way of increasing the quantity of urea excreted by the kidneys, and of bile by the liver, may afford an explanation of the satisfactory terminations of such cases. Certain it is, that in a fatal case of pure uncomplicated typhus which I witnessed very lately, and where the patient died comatose, with symptoms similar to those caused by suppression of urine, although this fluid was secreted in considerable quantity, on accurate examination, it was found to be very deficient in urea.

In a paper published in the Lancet, Vol. i. for 1837–38, p. 198, by Mr Tait, the author mentions that he has derived equally good effects from this remedy in scarlet fever. His cases were all of the purely inflammatory type,—blood-letting, leeches, and blisters being occasionally employed. He commenced with from twelve to fifteen drops of colchicum every three or four hours to robust farm-servants, and in children of from four to six years, he administered three or four drops, and diminished the dose, watching its effects, stopping whenever these were manifested. The pulse was diminished in frequency and force; the palpitation of the heart, which, in young subjects, was often perceptible to the eye, subsided; the inflammation and pain of the throat were alleviated; and the patient often expressed himself much better. Vomiting was excited in a few cases, but, as this seemed always to be followed by an improvement in the state of the tonsils, and generally abated after the rejection of a quantity of bile, it was never found necessary to interrupt the use of the medicine. The bowels were more or less purged, and the improvement was always so suddenly marked after a free discharge of dark bilious stools, that he always considered the patient out of danger when these appeared.

So early as April 1836, I had an opportunity of seeing colchicum extensively and very successfully used in the treatment of scarlatina by my father; and more recently, when this disease prevailed epidemically, I had occasion in several cases to observe its powerful influence over the symptoms. In every instance, indeed, where colchicum was employed, the malady very speedily proceeded to a favourable termination; while other cases, apparently similar in their character, in which this medicine was not administered, proved by no means so satisfactory; several having terminated fatally, and the sequelæ of others being exceedingly troublesome.

The pathological tenets lately prevalent in France, and to a certain extent adopted by many in this country, first inculcated by Broussais, which prevented the treatment of Rasori from being fairly tried, will, I fear, act still more powerfully as an obstacle to the employment of colchicum in fever. That it may be used with perfect safety, if judiciously administered, especially during the first days of the disease, may be considered a decided point; and I would add, that the favourable opinion I entertain of its efficacy is not deduced from seeing its effects in a few detached cases of typhus; but from the general results in a number, at different times; but especially during the prevalence of the disease, epidemically amongst all classes of society; and particularly among the poor of Leith—a town containing a population of 28,000 inhabitants, during the epidemic that prevailed there in 1836.

In addition to what I have said in regard to the probable manner in which colchicum acts beneficially in fever, I would suggest that, from what we have seen of its physiological action, the salutary influence may depend on its expelling from the circulating fluids, certain constituents by which they are contaminated or altered, in consequence of the impeded function of certain organs, in the early stage, and during its continuance, especially the kidneys and liver.

It is reasonable to infer, from the powerful influence which colchicum possesses in diminishing vascular and nervous excitement, and from its effects on the excretory organs of the body, and probably in the way of equalizing the circulation, that it may be useful in many local inflammations, both acute and chronic, so as to become a valuable auxiliary to the lancet; and in some instances entirely to supersede its use. So long ago as 1820, Mr Haden published a work on this subject, in which he has related cases which prove, as we might have expected, the meadow-saffron to be a remedy possessed of great power in relieving such states of the system. He employed it principally in pulmonary and laryngeal inflammation with decided advantage; and in such cases, he seems almost entirely to have trusted to its effects, to the entire exclusion of blood-letting. Although I am not so sanguine as to expect that, in acute forms of such diseases, we can depend upon colchicum alone, yet, from what I have seen, I speak with confidence when I state that, with the exception of depletion, there is no remedy capable of producing more beneficial results; and, in many subacute inflammations, more particularly the evacuations of blood, need be very limited in extent, if promptly followed by the judicious administration of colchicum. In pleurisy, pneumonia, bronchitis, and croup, I have seen most decided benefit result from its employment.

In proof of its efficacy in the last named disease, I adduce the following case without comment.

November 24th 1840, at eight o'clock A. M. A. G. aged three and a-half years, labours under decided symptoms of croup, which have been coming on for the last forty-eight hours; pulse 180. Directed four leeches to be applied over the region of trachea, and four grains of calomel, to be divided into three doses, one of which was ordered to be given every third hour, and each dose to be followed by four drops of colchicum wine.

5 o'clock P. M. Leeches bled well. All the calomel taken and sixteen drops of the colchicum wine. Has perspired freely; bowels once moved; symptoms of the disease somewhat mitigated; had retched several times; pulse 160. *Continuetur Vinum Sem. Colchici.*

11 P. M. Symptoms of the disease greatly alleviated; skin moist,

but the perspiration less than at last visit; bowels have been freely moved; the evacuations resemble chopped spinage; pulse 116. *Intermit. medicamenta omnia.*

November 25, nine A. M. Has had a tolerable night, and is to-day greatly relieved. Pulse has fallen to 100; very slight croupy sound perceptible during respiration. Expresses a desire for food. *Continuetur Vinum Colchici ut antea.*

2 P. M. Continues to recover; several alvine evacuations have been passed since last report, which are less green in colour; pulse 96. *Intermit. medic. omnia.* Gave particular directions to avoid exposure to cold, and to be kept on farinaceous diet.

10 P. M. Is free from complaint.

26th November, noon. Continues convalescent.

In a very well marked case of icterus which lately came under my observation, the patient was cured in a very short time, (within the week,) by the administration of three draughts, composed of the following ingredients:

> ℞. *Sulph. Magnes.* ʒiii.; *Carb. Magnes.* ʒss. M. *Solve in infus. Sennae* ʒii. *et adde Vini Sem. Colchici*, gtts. l. which were used every alternate day.

Each draught acted powerfully as a cathartic and emetic, besides producing most profuse diaphoresis.

In inflammatory affections of the head, as has been suggested by my father, it is probable that colchicum will be a valuable remedy, but of this I have had little experience. His expectation of its being an anthelmintic, is not, however, I fear, likely to be realized, as I have found it fail, though used to as great an extent as I could prudently do, in a case of tape-worm in the human subject; and in the dog which was the subject of my first experiments, strange to say, a large tape-worm alone remained in the bowels, all other contents from the stomach to the extremity of the intestinal canal having been evacuated by the operation of the colchicum.

I need now, I trust, say little in refutation of the opinion entertained by many, that colchicum is not only a medicine of doubtful efficacy, but that its internal administration is dangerous. That a medicine possessed of such active properties requires a degree of caution which has too often been disregarded, and consequently mischief done, I verily believe; but the same objections may be urged against every other active medicinal agent we are in the habit of employing. For my own part, I am perfectly convinced that, if judiciously administered, so as to secure the full effect of the medicine without the injurious consequences of an overdose, it may be fairly considered a safe and potent drug, and amongst the most valuable in the materia medica.

In prescribing this medicine, and in making my experiments, I have used the *Vinum Seminum Colchici* since the precise effect of a proper dose of that preparation has been accurately ascertained; but I have no objection to the substitution of the acetate recommended by Sir Charles Scudamore and others, as a preferable preparation, after proper pains have been taken to ascertain the dose requisite to secure the effect which colchicum in that form is capable of producing.

In conclusion, I have only to express my earnest hope that the foregoing pages will contribute towards the elucidation of the physiological and therapeutical properties of *Colchicum Autumnale,* and

Dr HENDERSON'S CASE OF MOLLUSCUM CONTAGIOSUM.

Edinr. Med. & Surg. Jour.

Plate IV. p. 213. Vol. LVI.

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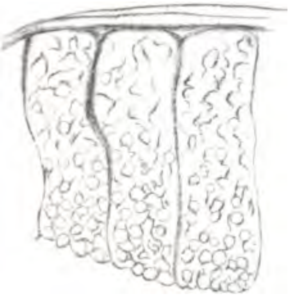

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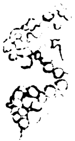

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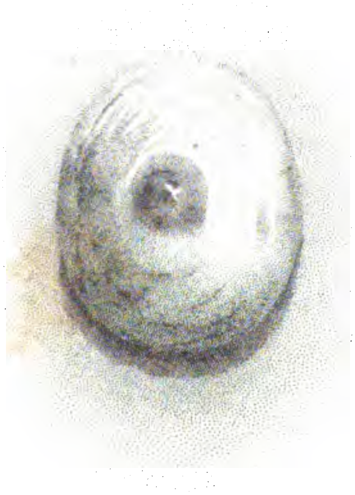

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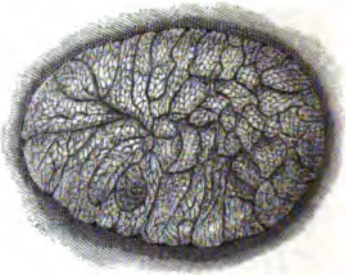

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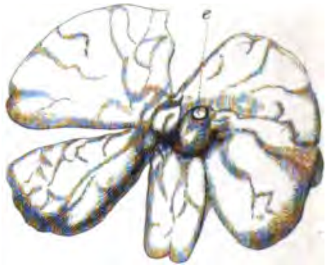

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that my investigations may tend in some measure to remove the prejudices that exist in the minds of many at home and abroad, against this potent medicine, the value of which, on the continent of Europe, is so little appreciated that, during a late residence of six months at Vienna, I never once heard of colchicum being prescribed, and during that time it certainly was not administered to a single individual in the Colossal General Hospital (containing upwards of 2000 patients) of that city. Nor did I once see it ordered in the practice of the physicians or surgeons at the Hotel-Dieu or La Charité in Paris, during a six months sojourn in that metropolis.

*Leith, 1st June* 1841.

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## ART. XI.—*Notice of the Molluscum Contagiosum.* By WILLIAM HENDERSON, M. D., Physician to the Royal Infirmary, Edinburgh, Lecturer on Pathology and Practice of Medicine.

THE remarkable disorder which was first described by Bateman under the name of *Molluscum Contagiosum* appears to be among the rarest of cutaneous diseases. Willan, Alibert, Rayer, Biett, Cazenave, and Schedel appear never to have fallen in with a single case of it; and, indeed, the only original notices of it on record are those of Bateman and Carswell; the latter of whom communicated to Cazenave and Schedel some particulars of five cases which had come to the knowledge of Dr Thomson, the distinguished Professor of Pathology in the University of this city. Bateman appears to have seen only five cases of the disease, though two others are noticed as having come to his knowledge in connection with the history of these. From the accounts of the genus Molluscum, published in 1840, by M. Maximilien-Maurice Jacobovics, it would appear that the species to which the following particulars refer continued unknown to the French dermatologists; and I have not been able to trace any notice of it in such German works as I have had access to, which treat of cutaneous disorders.

In July of 1834 I had an opportunity of seeing four cases of the *Molluscum Contagiosum* among children of poor parents residing in Jamaica Street of this city. Three of these cases were children of the same family, and the fourth was a child of a neighbour in the habit of associating with the others. Though the circumstances are calculated to excite a suspicion that the disease was communicated from one to another of these by contagion, I could not trace the transmission so conclusively as Bateman and Thomson have done. One of the three children had exhibited the disorder six months previously, but from what source was unknown. A second became affected a month later; and the third only a fortnight before the date of my attendance.

The child first affected was 18 months old when the molluscum appeared. The tubercles presented themselves first on the left upper eyelid, and successively affected the other eyelids and the face. When I saw the child, there were about a dozen tubercles on the face in various stages of development, and one only elsewhere,—on the right ankle. From the account I received from the mother of the progress and duration of the tubercles, it appeared that they differed much in these respects. Two had existed on the right upper eyelid for nearly six months; while several which had appeared on the hands had run their whole course in about a month. This diversity was doubtless dependent on the degree of exposure of the tubercles in the different situations to injury or irritation, for their disappearance, as stated originally by Bateman, is owing to inflammation, in consequence of which they suppurate slowly, presenting ultimately the characters of a prominent pustule.

It does not appear that the tubercles are necessarily numerous. A twin brother of the child to whom I have just referred, though affected with the disease five months before I saw him, never had more than two tubercles, one on the leg, and another on the shoulder. These had not then become inflamed. At the time when I saw the other two children, each had but one tubercle, but I did not learn the subsequent history of the disease in them. The twin children were very unhealthy. When committed to my care, the child who was the most affected with the tubercles had a tumid belly, emaciated limbs, was subject to diarrhœa, and had a squalid appearance. The other was not in so bad a state at that time; yet both continued sickly; were in the following year affected with *psoriasis gyrata;* and ultimately died within a few hours of each other, with the symptoms of acute hydrocephalus. I had not an opportunity of watching the course of the molluscum until its final disappearance in these children; but I ascertained, nine months after they first came under my care, that the disease had disappeared, and that its duration had extended to twelve or thirteen months. The description and plate contained in Bateman's continuation of Willan's treatise on cutaneous diseases correspond in every essential particular with what was presented in the cases to which I have been referring.

Lately a fifth case of *molluscum contagiosum* has fallen under my notice, and has afforded me an opportunity of examining the structure of the tubercles, and the microscopic characters of the atheromatous matter which they contain. I am enabled by Dr Paterson of Leith to mention the existence, at the moment of my writing this, of three other cases which have recently occurred in his practice, so that now twenty cases of this curious disorder are on record.

Of the following case I could obtain no history, either of the source of the disease or of its duration. The boy appears to have been an orphan, and was removed from the workhouse to the Royal Infirmary, where he fell under my care.

Philip Walker, aged 8, admitted April 17th 1841.

This patient can give no exact account of the history of his case, but on admission he presents the following appearances.

His head is covered in several places with large prominent scabs, varying in size from that of a sixpence to that of a half-crown.

On the lower part of the abdomen, the penis and scrotum, and about six inches in extent of the inner surface of both thighs, there are seen from three to four dozen tubercles, varying in size from a millet seed to a pea. They are in general of a round form, but a few of them appear flattened, as if from pressure. In the majority the point of attachment to the skin is distinctly smaller than the remoter part, still it cannot be called a peduncle. At the apex of each tubercle, a small dark-coloured point is seen, which marks the seat of an opening communicating with its interior, and exuding a milky-like fluid on pressure. On the left side posteriorly, about a finger's breadth from the spine, and at the lower part of the chest, there is a soft swelling an inch and a-half in length from above downwards, and an inch and a-quarter in breadth, of an elliptical form. In the centre of this swelling there is a smaller and gentler elevation, of a dull purplish colour, with vascular ramifications, in the apex of which there is a small rounded aperture, from which a thickish matter, closely resembling finely ground rice boiled, can be squeezed. There is no pain in the swelling; he says he has noticed it for many months, and that it was at one time much smaller. On the right arm, four tubercles, similar to those found on the pubis, exist, and ten are seen on the left arm. At the bend of the right knee, and upon the inner ankle of the left foot, a small superficial ulceration exists, which in the latter situation is partly covered with a dark-coloured scab. The feet are œdematous; the skin over them is red, and they are tender on pressure. The abdomen is very tense, and yields a tympanitic sound on percussion. He has frequent and rather severe cough, especially at night. His tongue is foul, and pulse above 100. His bowels are somewhat loose, several thin yellow stools being passed daily.

The sound of percussion is impaired all over the right front, also from the axilla downwards laterally. Behind, percussion on the right side is less resonant than on the left, but not absolutely dull. The sound of respiration is somewhat harsh upon the right back, and upon the right front is dry and blowing, mingled with some sibilant rattles. The left side of the chest moves much more freely in inspiration than the right. The heart appears to beat in its natural situation; its sounds are heard with remarkable distinctness over the left, as contrasted with the right side. The left side of the chest, by measurement, is three-quarters of an inch larger than the right. The skin is harsh and dry; pulse 108; bowels regular.

May 6th, noon.—At six this morning he became affected with sudden and severe pain in the hypogastric region, and now the pain and tenderness of the belly are general, with more tumidity and tension than formerly. Has had three stools since the pain came on; is now breathing quickly, with some tracheal rattle and bronchitic thrills on the right front. There are several lymphatic glands considerably enlarged in both axillæ and right side of the neck. Pulse 126, scarcely perceptible at the wrist; extremities rather cold. He died eight hours and a half from the time when the pain occurred.

The body was examined on the 8th of May. It was much emaciated. A considerable quantity of turbid serum was found in the abdomen, with recent coagulable lymph in both iliac regions—in the basin of the pelvis, and on the upper surface of the liver. The subserous cellular membrane of the bowels, and of the parietes of the abdomen, was the seat of innumerable small whitish tubercles. The omentum was contracted on the colon, and filled with tubercular matter. The mesenteric glands were large, and most of them filled with tubercular matter. The right lung was at its apex, and in several parts near its surface, the seat of tubercular masses; the whole lung a good deal loaded with blood, and an ounce and a-half heavier than the left, which was not affected with tubercle, and not particularly engorged. In a narrow, transverse, and old ulcer of the ileum, a perforation was found. Several of the patches were dark, elevated, and firm.

Bateman in his description of the tubercles notices the aperture as imperceptible. In all the cases I have seen, however, the aperture was very easily discerned in the larger mollusca with the naked eye; and, indeed, in many of them was of considerable size. With the aid of a common lens, the terminal opening was ascertained to exist even in the smallest and most recent of the tubercles which I examined—some of them less than a small pin's head,—so that we must look on it as an essential part of their structure, and not as the result of changes occurring at an advanced period of their growth. The existence of the aperture at the earliest stage of the tubercles, led me to suspect that they might probably be diseased follicles. On carefully inspecting a piece of skin which I had removed from the back, along with the large molluscum noticed in the case, I observed many of the delicate hairs emerging from minute eminences; and on examining these with a fine point, I could pick out a little semi-transparent mass from the follicle to which each hair belonged. It was doubtful whether these were mollusca in their earliest stage or not; and I therefore examined other larger bodies, with the unequivocal characters of the disease, and found a fine hair in the mass of one molluscum a little less, and of another a little larger, than an ordinary pin's head. In several tubercles of the common mature size, I searched in vain for the presence of a hair.

The first six figures in the plate represent the appearance of the tubercles as witnessed with the naked eye. The first figure shows the common size and form of the tubercles when fully developed. In the 2d and 3d Figures are represented the free and attached surfaces of a tubercle, consisting of three mollusca, each with its proper aperture, and separated throughout by what appeared like dense cellular laminæ. The tubercles have an integument of epidermis, and underneath this an extremely delicate vascular layer, continuous with the surrounding *rete mucosum* and *cutis*. The vascularity is in many of the tubercles very apparent through the epidermis; and is further demonstrated by the quantity of blood which exudes when the surface is pricked with a lancet. The mass within this integument, or the disease, properly speaking, is loosely attached to the cutis and cellular membrane, except at one point—the aperture, where the adhesion is pretty firm.

In the 4th, 5th, and 6th Figures are exhibited three views of a small tubercle, separated from its dermoid investment. Figure 4 is a lateral view, showing the division into little lobules; Figure 5 is a view of the attached surface, the extremities of the lobules having been separated with the point of a pin; Figure 6 is a view of the aperture, within which there is a small common space or cavity, to which the cavities of the lobules converge. All the tubercles do not present so regular an appearance, as that which has been shown in these figures; pressure and different rates of growth in the several lobules effecting many diversities of form; but the general disposition of the parts is the same in all.

Figures 7, 8, 9, 10 are views of the structure and contents of the tubercles considerably magnified. Figure 7 represents a transverse section of a portion of the wall of a tubercle. It shows the wall to consist of parallel cells projecting towards the interior cavity from an investing tegument or cyst of much delicacy. Within these parallel cells are exhibited small globular cells in considerable abundance, seen the most distinctly towards the inner extremities of the parallel cells. These globular cells are represented in Figure 8, as seen on the surface of the cavity of a tubercle; and in Figure 9 they are shown as escaping from ruptured parallel cells into the cavity. It is of these globular cells that the atheromatous matter which can be squeezed from the tubercles chiefly consists. Some of this matter is represented in Figure 10. The globules or cells vary in size, and contain nucleoli, some of which appear also in the fluid in a separate state. These cells are from the 1400th to the 3000th part of an inch in diameter.

Figure 11 is a sketch of the large molluscum on the back; Figure 12 gives a view of the opposite surface of this body—that which is in connection with the subcutaneous tissue. It had much of the general appearance of a conglomerate gland, and was easily separated into a multitude of little lobules. These were united by cellular tissue to one another, and the whole was invested in a dense tunic of cellular membrane; after removing this investment, the surface of the molluscum was found covered with a fine net-work of vessels which dipped into the interlobular spaces. Figure 13 represents the outer surface of the mass of lobules, and in this surface, as indicated by the letter *e*, is the point at which the aperture of this molluscum exists. This surface lay in immediate contact with the cutis, which was very thin towards the situation of the aperture, and allowed of a greater prominence at that place. A little dissection separated the mass into four divisions,—each composed of many lobules,—and all of these communicated with the aperture, from which they could be inflated by means of a blowpipe. This molluscum, therefore, illustrates on a larger scale the conformation of the smaller ones, composed as it is of many separate hollow processes communicating at one point with one another, and the external opening.

Figure 14 shows the appearance of some of the matter contained in this molluscum. The bodies indicated by the letter *a* appear to be globular cells which had burst. This was rendered probable by the side view of one of them as it turned over in crossing the field of the microscope suspended in a little water,—when it appeared flattened as at *b*, though previously of the shape of the figure beside it to the left. The greater part of the matter contained in this molluscum consisted of the debris of the cells, and nucleoli.

Figure 15 displays the appearance presented by a thin slice of the walls of this large molluscum, as seen through three lenses. The parallel cells are seen projecting from the common tunic,—and three minute bud-like bodies are shown as occupying the place of parallel cells that had been apparently cast off. Professor Reid, who had observed in a specimen of molluscum given him by Dr Paterson of Leith, what I have described as the parallel cells containing the globular, which subsequently in the former of atheroma constitutes the principal secretion of the turbercles, has suggested that, in this succession, there may be recognized an evidence of what Henle advances respecting the manner in which the secretions in general are probably formed—to wit, in successive crops of cells sprouting from the membrane which yields the secretion. The above observations on the cells and secretion of the *molluscum contagiosum* certainly afford no inconsiderable presumption in favour of this supposition, when we consider that morbid phenomena are rather illustrations of, than exceptions to, the natural course of organic operations.

It is very probable, as Bateman has suggested, that the atheromatous secretion is the means by which the disease is propagated, yet inoculation with it in the ordinary way has not succeeded in the hands of Dr Paterson or in mine. If we are to consider the disease as peculiar to the follicles, it is easily understood how simple inoculation, without attention to the precise point at which the matter is inserted, so as to insure its contact with a follicle, should fail in propagating the tubercles.

The treatment of the tubercles, in order to cause their speedy removal, ought obviously to consist of measures calculated to excite them to inflammation. Dr Paterson informs me that he has readily effected this purpose by touching them with caustic potass; of course the earlier this is done in the progress of each the better. A fine point of nitrate of silver introduced into the aperture would doubtless effect the same end.

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## ART. XII.—*Postscript by Mr J. Massey, Nottingham, containing the conclusion of the Case of Collection of Biliary Fluid in the Thyroid Body.* (See Vol. liv. pp. 454–548.)

SINCE last report, December 28th, the patient, from having imprudently exposed himself to severe weather, had rigors accompanied with general febrile excitement, and an increased accumulation of purulent matter had taken place at the lower part of the sac. There was considerable bilious derangement with sickness and vomiting of bilious matter. The purulent matter was freely evacuated by enlarging the opening at the inferior part, making it as depending as possible. It continued to discharge a serous fluid, varying more or less in quantity till March 13th 1841; at that period it was completely cicatrized, and he was quite well. The opening powder ordered, December 6, was repeated every other day for nearly a month;—previous to which also was occasionally given a five grain calomel pill. These were required from the very confined state of the bowels. They procured but one evacuation. On the 7th January he omitted all opening medicine, and from that period to the present time, March 22d, the bowels have been regularly and daily relieved. This has not been the case for many years. He has lost the bilious tinge completely, and is gaining flesh. There is no abnormal appearance remaining except from the cicatrix, and a little fulness at the lower portion from the division of a few fibres of the sterno-mastoid muscle by the last free incision made to evacuate the matter. I have forwarded the result of this interesting case, from the peculiar torpid state of the bowels at the time the sac contained the bilious fluid, and their very opposite state after its complete evacuation.

# PART II.

## CRITICAL ANALYSIS.

### Art. I.—*Elements of the Practice of Medicine.* By Richard Bright, M. D., and Thomas Addison, M. D., Physicians to Guy's Hospital, and Lecturers on the Practice of Medicine. Vol. i. London, 1839, 8vo. pp. 613.

The Practice of Medicine, Practice of Physic, or Practical Medicine, is one of the complex departments of the healing art; that is, it consists of several simple or elementary branches; and from these elementary branches it derives much of the materials of which it consists. The simple or elementary branches of medical science are, Anatomy, healthy and morbid, Physiology, general and special, Animal Chemistry, Pathology, general and special, Materia Medica, and Pharmacy. From all these departments that denominated Practice derives a large proportion of its materials; and the correctness, amplitude, and efficacy of the latter always depend very much on the state of the former sciences.

Anatomy furnishes information on the structure, position, magnitude, component parts, and the relations of the organ or textures which may be the seat of disease. Physiology, by determining the healthy actions and functions of different organs, enables us to judge when these actions and functions are deranged,—what is the amount or kind of derangement,—what may be the probable cause of such derangement,—and what may be the ultimate effects, if means be not adopted to remove it, and to re-establish the healthy state of the organ. Physiology in this manner becomes gradually converted, as it were, into pathology, the object of which is not only to trace the gradual or the sudden transition from healthy to morbid action, but to study the multiplied varieties of morbid structure,—to contemplate the infinitely diversified forms of unhealthy action,—to understand their essential characters, not only as differing from healthy action, but their differential characters as distinguished from each other, and to estimate accurately the value of those external signs which indicate either the presence, the amount, or the peculiar kind of diseased action. Materia Medica, which, in its most extensive acceptation, includes the history and properties of all those agents and articles which are either useful in preserving health and warding off the attacks of disease, or removing disease when actually established, and consequently comprises not only the Materia Medica, properly so named, but also the *Materia Alimentaria*, with the kindred branch of dietetics, is another branch of science, which, though in several respects complex, that is, consisting of several simple or integral departments, as Natural History, Chemistry, Botany, and Pharmacy, is, nevertheless, in relation to practice, an elementary department. When pathological knowledge has enabled us to establish what are called curative indications, that is, has specified the objects to be attained, and the purposes to be accomplished in order to effect a cure, then the science of Materia Medica and Pharmacy, and especially its therapeutic department, informs the practitioner of the agents by which he is to accomplish these purposes.

Of all these elementary branches, pathology is certainly the most important, whether we advert to the value of the information which it professes to supply, or to the incessant and repeated reference which the physician is obliged to make to it. Without pathological knowledge, indeed, no rational practice of medicine can exist; and, in proportion as the former is correct and well-founded, the latter will be efficient and successful.

Pathology is, however, itself, not altogether a simple branch of medical knowledge. Besides implying a knowledge of healthy anatomy and physiology, it derives a large proportion of its information from morbid anatomy, or the facts disclosed by the careful inspection of bodies cut off by various diseases. Much also it derives from what may be termed morbid physiology, that is, the knowledge of the variations which the functions of the living body undergo in various stages of disease,—a branch chiefly to be cultivated, to be rectified and enlarged by careful clinical observation. In this division also, pathology has been much indebted to chemical experiment, and will certainly be still more indebted to that powerful and prolific source of correct knowledge. A large proportion also of information, sometimes altogether new, and always very important, it derives from observing and recording the effects of various injuries and accidents upon different parts and organs of the human body. These, by placing the parts in new, unusual, and unnatural situations, are often the indirect means of calling into action various powers and resources in the system, which, without the interposition of such extraordinary means, might have remained dormant and involved in obscurity.

The branch of medical knowledge thus constituted has been naturally divided into two departments,—General Pathology and Special Pathology.

By General Pathology is understood that branch of knowledge in which are explained the nature of disease as distinguished from health; the principal or leading forms which it assumes; their general relations both to the state of health and also to each other; and the general causes by which diseases are induced, and, as far as may be practicable, the mode in which these causes operate. Special Pathology, on the other hand, is devoted to the examination and the explanation of the nature of particular diseases; attempts to ascertain the numbers of individual maladies; considers the proper characters which belong to each, and selects those by which they may be distinguished from each other; and, in short, studies all those minute details which tend to illustrate the nature and peculiar characters of particular forms of morbid action.

Many treatises on general pathology, of various degrees of merit, have been composed at different periods by different authors. Of these, some have treated the subject in connection with physiology; for instance, Stahl, Boerhaave, Eller, Gregory, Darwin, Sprengel, and Dr Alison. Others, again, have considered the subject more expressly by itself; and to this class may be referred the elementary treatises by Sauvages, (1732,) by Ludwig, (1754,) by Gaubius, (1758, 1763,) by Nietzki, (1766,) by Caldani, (1772, 1776,) by George. Frederic Hildebrandt, (1795,) by Henke, (1806,) by Brandis, (1808,) by Burdach, (1808,) by Fanzago, (1813, 1816,) by Parry, (1815,) by Dalla Decima, (1819, 1823,) by Chomel, (1824,) by Van Coetsem, (1825,) by Hartmann, (1826,) and by Bufalini, (1828.)

Of the whole of this second class of writers, the general method has been pretty much the same. They have explained, or attempted to explain, the characters and peculiarities of disease in general, whether consisting in mere morbid or perverted, or disordered action, or dependent on, or connected with, more or less change in the constitution of one or more of the tissues, or of the organs of the human frame. They have attempted to distinguish, describe, and illustrate the nature and tendency of the leading forms of morbid action. They have endeavoured to investigate the origin of diseases, and to develope the nature and operation of those circumstances which act or seem to act as causes. And lastly, they have undertaken to estimate the nature and value of the external morbid phenomena or symptoms which are either felt by the patient or fall under the observation of the physician, and to discover and explain the relation subsisting between these external phenomena and their internal causes, and in this manner to employ them as useful guides in ascertaining the presence or absence, the nature and the degree of morbid action, or morbid structure, or of both. This department of general pathology, which has received the name sometimes of symptomatology, sometimes of semiotics, *(Semeiotice)* (Σημειον *signum,)* has at all times occupied a large proportion of the attention and labour of writers on general pathology;

and in not a few instances, particular treatises have been devoted to this subject alone, as was done by Christopher Godfrey Gruner of Jena, (1775,)[*] Berkenhout, (1784,)[†] Rougnon of Besançon, (1786,)[‡] Sprengel of Halle, (1801,)[§] Landré-Beauvais of Paris, (1813,)[||] John Fr. Henry Albers of Bonn, (1834,)[¶] and A. F. Schill of Tubingen, (1836.)[**]

It cannot be doubted that this is a most important department of pathological learning; and, in proportion to the amount of correct information which any physician possesses on this subject, he will be faithful and accurate as an observer, skilful as a reasoner from facts, always safe as a practitioner, and often efficient and successful. So great, however, are the changes which have taken place in the cultivation of this division of science, and so much has it been extended, modified, and rectified of late years, that it may be said to be, as to all the diseases of the heart and lungs, and many of those of the nervous system, to be entirely new. It hence results, that in almost all the systems of general pathology, the department of semiotics would require to be very much new-modelled before it could be of much practical use. The best treatises in this point of view are doubtless those of Landré-Beauvais, Albers and Schill, the last of which has been translated by Dr Spillan.[††]

Such is the general character of most of the treatises on general pathology, and such in general the method of treating the subject. In some, the order or arrangement is a little different from that of others; but the general method is the same. Thus, in some instances, the department of etiology, or that devoted to the general history of the causes of disease, occupies the first or the second place, and in others it occupies the third; while the symptomatology is placed in the second division. To give some idea of the different modes of treating the subject adopted by different authors, we may notice here the methods of arrangement observed by two of the most recent writers on the subject, Van Coetsem of Ghent, and the late Dr Hartmann of Vienna.

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[*] Semiotice Physiologicam et Pathologicam Generalem Complexa. In usum Praelectionum Academicarum conscripsit Christ. Godofr. Gruner, M. D., etc. Halae Magdeburg. 1775, 8vo. Pp. 687.

[†] Symptomatology, by John Berkenhout, M. D. London, 1784. 8vo. Pp. 124. This short treatise is rather an index to other works, or a dictionary of terms, than a system of symptomatology. It contains also a nosological lexicon or glossary.

[‡] Considerationes Pathologico-Semioticae de omnibus humani corporis functionibus. Auctore N. F. Rougnon. Vesontione Fasc. i. et ii. 1786, 1788.

[§] Kurt. Sprengel Handbuch der Semiotik, Halle, 1801.

[||] Semeiotique ou Traité des Signes des Maladies, par A. T. Landré Beauvais. Paris, 1813, 8vo.

[¶] Johan. Fr. Heinr. Albers Lehrbuch der Semiotik fur Vorlesungen bearbeit Leipzig, 1834, gr. 8vo.

[**] A. F. Schill Grundriss der Pathologischen Semiotik zum Gebrauche bei Vorlesungen. Tubingen, 1836, gr. 8vo.

[††] Outlines of Pathological Semeiology, translated from the German of Professor Schill with copious notes by D. Spillan, M. D. London, 183[illegible], 12mo. Pp. 236.

Dr Van Coetsem divides his work into three parts, the first, the *Pathogenia*, (the reader will observe that the penult of this word is long,) (Παθος *passio*, *morbus*, Γενεια, *generatio*,) or the production, formation, and different forms of disease, the second the *Aetiologia* (Αιτια, *causa*, Λογος, *doctrina*,) or the history of the causes of disease and their mode of operation; and the third the *Symptomatologia*, or the description of the external morbid phenomena, and the explanation of the connection between them and the various internal morbid processes and conditions in different organs.

In the first division of his work, the author, after some general observations on the causes of diseases, on the symptoms of diseases, on the phenomena of the *vis medicatrix*, on the seat of diseases in general, on the duration, event, and succession of diseases, on the differences of diseases, as exhibited in different classes of the sick, on the conjunction and disposition of diseases, and on individual differences between diseases, considers the state of the vital powers in different diseases, as they are deficient, enfeebled, excessive or overstrained, and perverted or thrown into an anomalous state. He then adverts to anomalies in the vital actions, to morbid transformations and new or adventitious products in the different textures, the existence of parasitical animals, (*entozoa*), and to monstrosities and malformations. Lastly, he takes a view of the various mechanical lesions, referring to this head all displacements (*ectopiae*), lacerations, ruptures, or false communications, fractures, the morbid deviations of the fluids, and as an appropriate termination, the different forms in which death is liable to take place.

In the second division, he takes a view of the causes of disease, much in the manner of Gaubius, Nietzki, Caldani, and Fanzago, though more according to the methods of modern terminology and distinction. First, Dr Van Coetsem considers the deleterious influence of the imponderable fluids as causes of disease, viz. light, heat, and electricity. Next, he directs attention to the morbific operations of the ponderable fluids, as the atmospheric air, and various conditions of that agent. Then comes the influence of articles of food and drink, different modes of dress, poisons, the contagions, the abuse of medicines, the detrimental effects of the premature or unseasonable cultivation of the arts and sciences, the pernicious influence of the passions and emotions, and lastly, the derangement of functions from the healthy state as causes of diseases.

The last head is manifestly too vague and general, and interferes with many of the divisions of the previous section; for of what disorder may it not be said that it is caused by a derangement in function; and of what deranged function may it not be asserted that it often depends on some change in structure?

In the third and last portion of his work, Dr Van Coetsem undertakes to explain the value of those signs by which the presence and extent of disease may be ascertained, and of those by which diseases may be distinguished from each other in the arduous art of diagnosis; and shows in what manner these signs may be employed, in order to enable the physician to establish correct prognostications.

Under this head, he treats of the signs derived from the external habit and appearance of the person, the colour of the surface, the state of the skin as to dryness, moisture, heat, coldness, the presence of different sorts of eruptions, the manner in which the patient lies, *(decubitus)*, and his quiescence or jactitation; the complexion, the countenance, the eyes, and their expression; the mouth and the lips; the state of the epigastric region, and the abdominal region in general; the state of the extremities, and of the organs of reproduction in both sexes. He then considers under the head of disturbances in the internal and external senses, the indications afforded by pains of different kinds; disorders of the memory, the imagination, and the judgment,—different sorts of delirium; vertigo or giddiness; derangements in vision; varieties of disordered hearing; disorders in smell and taste; disorders in the muscular movements, as various sorts of spasm and palsy; and derangement in voice and speech. He then considers, under the head of the abnormal phenomena of vegetative or organic life, the symptoms afforded by various disordered states in the several actions and processes of the alimentary functions, and the excretions of the alimentary canal; the indications deduced from the state of the pulse and its varieties, that of respiration and its varieties, hiccup, coughing, matters discharged by coughing; different modes of sleeping; derangements in the sexual functions; hemorrhage from various regions of the body; and in the seventh and last section, he takes a short but rather good view of the phenomena furnished by percussion and auscultation, and the best method of observing the phenomena thus recognized.

The author of this work shows that he has bestowed great study and attention on the subject.[*]

Dr Hartmann, who divides his treatise into four parts, arranges them differently; placing first pathology and general nosology; in the second rank, symptomatology; in the third, general nosography; and in the fourth and last place, etiology.

In the first division, on general nosology, after some general observations on the nature and characters of disease, as distinguished from health, and some remarks illustrating the subject of disease, or more particularly on the parts and elements of the animal economy, in which disease is seated, and on which its effects are displayed, he delivers first the distinction of diseases into dynamic, or those in which the properties of the texture, the actions of parts, and the functions of organs,—in short, the vital processes are principally disordered, (*morbi dynamici*) ; and organic, or those in which, along with derangement in properties, or in the vital processes, there is conjoined more or less derangement in structure. He then considers the different modes in which dynamic diseases may be induced, and the principal varieties under which they appear. He next distinguishes the class of dynamic diseases into those which consist in morbid affections of plastic life, and those which consist in morbid affections of animal life. Under the first head, he treats of morbid digestion, unhealthy assimilation, unhealthy secretion, morbid nutrition, unhealthy excretion, and morbid generation. Under the second head are considered abnormal cellular excitement, abnormal nervous excitement, and abnormal muscular excitement.

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[*] Medicinæ Theoreticæ Conspectus; sive Pathologiæ Generalis Compendium, ad usum Academicum Accommodatum, Auctore C. A. Van Coetsem Matheseos Magistro Hist. Nat. et Medicinæ Doctore in Academiae Gandavensis Facultate Med. Profes. Extraord, &c. Gandavi, 1825. 8vo. pp. 533.

He next takes a general view of the class of organic diseases, under the following heads ; lesions in cohesion, or what are more commonly called solution of parts, as contusions, wounds, fractures, and ulcers; unusual magnitude and conformation of parts, as in the different forms of enlargements of organs, tumours, enlargement of cavities, obstruction, contraction, and coalition of parts; unnatural connection of parts, as in imperforation and ankylosis ; vicious positions of different organs ; and lastly, the disproportionate relation of the fluids to the blood-vessels.

Under the second head, or that of Symptomatology, the author, after a general view of the nature of symptomatology, and some observations on symptoms in general, the sources from which they are taken, and the division of them into necessary and accidental, primary and secondary, constant or uniform, and temporary or variable, proceeds to treat of them individually, under the two general sections of, I. Symptoms belonging to the plastic system, or displayed in the functions of organic life; and, II. Symptoms to be observed in the animal system, or in the functions of animal life. Under the first head are arranged all the symptoms observed to take place in the processes and functions of the alimentary canal ; those furnished by morbid states of assimilation, including symptoms derived from the unhealthy state of respiration, of voice and speech, and of circulation ; those furnished by symptoms of morbid secretion, of nutrition, of excretion, and, lastly, of generation in the two sexes. Under the second head are placed all the symptoms derived from the senses, external and internal, as common sensation *(coenaesthesis)*, touch, taste, smell, hearing, and sight ; those derived from the state of the mental faculties ; those derived from different conditions of the muscular motion; and, lastly, the symptoms derived from the state of sleep.

The third general division of his subject is that denominated General Nosography, or the consideration of diseases in their relation to place and time, or, in other words, according to the parts or regions of the body which they affect, and their course and duration. Under the first head are placed the distinctions into local and general, idiopathic and symptomatic, sporadic and pandemic, epidemic and endemic. Under the second are arranged those into congenital and acquired, hereditary and connate; the different stages of the morbid process constituting disease; the type of the disease or the character which its symptoms and phenomena present as to continuity, intermittence, remittence, periodical recurrence; and the regularity, irregularity, and anomalous character of this recurrence; the duration of diseases; and the termination of diseases.

In the fourth and last general division, or that devoted to the subject of Etiology, the author gives a general but minutely subdivided view of the causes of diseases. This part is subdivided into two sections;—the first devoted to the consideration of the disposition to disease, the different forms which it assumes, and the different circumstances by which it is influenced; and the second to hurtful or morbific agents in general, including every class of circumstances, external and internal, which may operate injuriously on the animal frame; physical agents, articles of food and drink, abuse of medicines, poisons, and contagions; the influence of the mind, the passions and emotions, the morbific influence of muscular action, of sleep and wakefulness, of the immoderate action of the reproductive functions; and, lastly, of the diseases caused by parasitical animals.*

Soon after, a work still more elaborate appeared in Italy, from the school of Bologna, by Maurice Bufalini of Cesena, Assistant Professor of Clinical Medicine in that University, and Professor of Theory and Practice of Medicine in the University of Urbino. This work Bufalini evidently desired to make quite original, both in plan and in his method of treating the subject; and he hence abandoned the usual practice of treating pathology under the ordinary divisions of Nosology, Semiotics, and Etiology. "On the two latter departments of pathology," he says, "physicians trust much more to the guidance of facts, and their opinions are much less discordant, than in the other; nor could I hope myself to say of it more than what has been collected by their diligence, and it would be a fruitless labour to tread the same ground without advancing a step farther." In the department of nosology, further, he professes to confine himself to the examination of the actual lesions of the organism, according to the analytical method, that is, by separating and decomposing, as it were, complex ideas, or the idea of complex objects into their simple or integrant elements. Bufalini then takes a view of the different pathological systems that have prevailed in the medical world from the days of Hippocrates to those of Paracelsus and Van Helmont, and the chemical physicians; the system of the mechanical physicians; the system of the vitalists or dynamical physicians, Hoffmann, Bordeu, Cullen, Brown, and Darwin; the system of the eclectics or syncretists; and lastly, of the doctrines of the empirics.

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* Ph. Caroli Hartmann, M. D. et Professoris, P. O. in Scientiarum Universitate Vindobonensi, C. R. Theoria Morbi, seu Pathologia Generalis Praelectionibus Academicis Accommodata. Editio Altera Emendata, Vindobonae, 1828. 8vo. Pp.471.

Bufalini then defines disease, and treats of it in a general manner; of the seat of the primary morbid processes; of the course and termination of diseases; of the symptoms and signs of diseases; of the diatheses of Brown; of stimuli and contrastimuli; of irritants; of the morbid form of Bondioli; of the pathological condition of Fanzago; and of the diathesic and adiathesic processes of Tommasini. The discussion of these subjects, many of which are little known to English readers, occupies the first volume.

In the second volume he traverses a more extensive field, and enters more into the detailed relations of individual forms of disease. The first chapter of the volume, the 19th of the work, is chiefly occupied in various general physiological speculations on the characters of organized bodies, and the nature of their phenomena and actions. He then enters on the examination of the influence of external agents on living bodies; and in this chapter, (20,) it is clear, that the author has been unable to adhere to his resolution of not introducing the subject of etiology. The whole of this and the subsequent chapter on the genesis or developement of diseases must be regarded as completely etiological. Then comes a chapter on the pathological changes in the fluids. Bufalini treats next of solvent processes peculiar to many diseases; for example, scurvy, ague, pernicious agues, sweating sickness, cholera, mucous fever, croup, bilious fever, yellow fever, puerperal fever, plague, and contagious diseases in general.

The titles of the ensuing chapters will convey a sufficiently full idea of the contents of the rest of the work. These are as follow: On lesions by excess or defect in organic assimilation; on the variations in the proportion between the different products of organic assimilation; on certain lesions completely latent and peculiar to organic assimilation; *e. g.* strumous diathesis, tubercular diathesis, scirrhous and cancerous diathesis, encephaloid diathesis, and herpetic diathesis; on the dynamic condition of diseases; on the foundations for distinguishing the differences of diseases; on simple diseases, and the most convenient mode of distributing them; including in one class, various diseases with fluxion, or what is called in this country morbid determination or congestion, hemorrhages, morbid or preternatural solutions or adhesions, changes in nutrition, and organic productions; and in the second class, various phlegmasiae, fevers of different kinds, and several diseases originating in the morbid diatheses.

This work is extremely scientific, and shows much acuteness, ingenuity, and learning. But it is in many parts not very clear, and somewhat prolix.*

From the view now given of the nature and objects of general pathology, it must be evident that in it disease is considered in a very different light from that in which it is viewed either in special pathology or in the practice of medicine. General pathology is neither the same with practice of physic nor special pathology, as has been sometimes maintained by persons whose ideas on the departments of medical science and on their mutual relation are confused and obscure. In general pathology, disease requires to be considered in its general or abstract characters, with little reference to individual forms of morbid action; and hence it forms the proper department for the consideration of all those general circumstances which are common to all, or at least many different diseases, and which, consequently, cannot be, with propriety, introduced in a treatise on special pathology, and on practical medicine. In general pathology, also, are explained many circumstances and terms, the knowledge of which is necessary both in special pathology and in practice, and which cannot, without breaking the continuity of the different subjects therein treated, and causing more or less repetition, be properly introduced in treatises on the latter subject. Where this important distinction is not observed, we find either that the descriptions of individual diseases are given in a confused and unmethodical manner, or that their continuity is interrupted by episodical observations, or their length is increased by repetitions and explanatory remarks, which might otherwise have been rendered unnecessary.

Special or particular pathology, on the other hand, is a different department, and, with different objects, is placed in very different circumstances. In special pathology, the object is to study and elucidate the nature of individual diseases, to ascertain those facts in their history which are peculiar to each, and which tend to explain those circumstances which illustrate the nature of one disease as different from another, and from the whole class of morbid actions in general. Hence, special pathology always forms an important constituent and integrant part, as it were, of Practice of Physic; and upon it, as a foundation, all correct nosological distinction, and all sound diagnostic characters must be made to rest; and from it also all just and rational therapeutic indications must proceed.

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* Fondamenti di Pathologia Analitica di Maurizio Bufalini Cesenate Medico in Patria gia Assistente e Lettore Straordinario alla Cathedra di Clinica Medica nell' Universita di Bologna, &c. Ediz. terza, Tomo i. Pesaro, 1828. Pp. 283, T. ii. 1830. 8vo. Pp. 757.

As general pathology consists of several divisions, viz. general nosology, general symptomatology, general nosography, and general etiology, so particular pathology may be said to consist of particular nosology, particular symptomatology, particular nosography, and particular etiology, that is, the nosology, symptomatology, nosography, and etiology of particular diseases; and, indeed, in every good and perfect system of practice of physic, this is the mode in which the nature, history, characters, and causes of diseases ought to be described, and their course and probable terminations should be specified as far as may be practicable.

It thus appears that special or particular pathology, though forming an important integrant part of practice of medicine, is itself a complex department of science, and like general pathology, in this respect, derives its facts, its principles, and its inferences, from several different sources.

Special pathology, however, though an important part of practice, is not the whole; and it requires to have its principles applied and adapted to the different remedies required in each disease, and in each stage of disease, in order to render its powers complete and efficient. This it is the business of special therapeutics to do,—a department which bears to general therapeutics the same relation which special pathology does to general pathology.

In general therapeutics, the general principles by which the formation and approach of diseases may be prevented, and the means by which, when they are actually formed, they may be cured, their progress retarded, their effects obviated, and the symptoms alleviated, are considered and explained. In particular, or special therapeutics, on the other hand, the adaptation of these principles to particular diseases, and the employment of the individual remedies demanded by particular diseases, and certain stages of disease, form the main object of consideration. Hence, as in special pathology, we study the pathological circumstances belonging to individual diseases, so in special therapeutics it is necessary to apply and adapt to the pathological peculiarities of each disease those therapeutic measures, whether remedial, dietetic, ascetic, external or internal, general or local, which are calculated to remove, to subdue, to moderate the disease, or to alleviate or palliate its symptoms.

On general therapeutics various treatises have been published by different authors. As good examples, for we cannot enumerate all, we may refer to the second part of the Conspectus of Dr James Gregory, and a very excellent summary of general therapeutics by the late Dr Hartmann, the author of the system of general pathology already mentioned.*

Special therapeutics, like special pathology, naturally constitute part of every work on the practice of medicine; and, indeed, a complete treatise on the practice of medicine must be virtually and essentially a treatise on special pathology and therapeutics. The merits of any work, therefore, on this subject, must be estimated and rated solely as it presents a correct and just view of the facts, the principles, the doctrines, the reasonings, the conclusions, and the practical applications of these two important divisions of medical science.

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* Phil. Caroli Hartmann, M. D. &c. Therapia Generalis secundum praelectiones publicas, Edita a Medico Practico. Lipsiae, 1835. 8vo. Pp. 94.

These explanations we have premised in this place, in order to enable our readers to understand what should be expected in a good treatise on practice of medicine; and, with the hope of supplying them with the means of themselves forming an opinion on the merits and qualities of a useful system of the facts and doctrines in this branch of medical knowledge, it will be further requisite to take a short view of the principal treatises that have appeared on this subject during the last half century,

The First Lines of Dr Cullen so long held their place both as an elementary work on the practice of physic, and also as a systematic and scientific treatise on special pathology and therapeutics, at once with teachers and practitioners, that no work, however great its intrinsic merit, and however celebrated its author, could be expected to make any progress in supplanting it. That eminent person, indeed, had so thoroughly renovated. and rectified the whole of the sciences of pathology and therapeutics, that he had in this respect proceeded very much in advance of his age. His descriptions of diseases were so faithful, his distinctions were so accurate and precise, his pathological views in general so strictly accordant with morbid anatomy, and his therapeutic principles so rational, that he had left little for subsequent authors to do.

Accordingly, many, if not all those authors who subsequently devoted their attention to the elucidation of particular diseases, made a point of quoting the doctrines of Cullen often to confirm them, sometimes to extend them, very rarely to controvert their correctness. The small number of authors also who attempted to compose treatises on practical medicine, made the First Lines, in general, their model; and even when they proposed to publish a system of their own, they were in general unable to deviate much from the method of the Edinburgh Professor.

The first, and perhaps one of the most successful attempts made after the time of Cullen, to compile a systematic treatise on the practice of physic was undertaken in 1781 by John Baptist Borsieri de Kanilfield, commonly designated by the Latinized appellation of Burserius. The Institutions of this author, published first at Milan, in quarto, and afterwards in octavo, in 1786, at Leipsic, were so generally esteemed, that they were translated into most of the languages of Europe. In amplitude and fidelity of description, in accuracy of diagnosis, in plenitude of pathological and practical illustration, and in judicious therapeutic precepts, the work of Borsieri has not been surpassed; and it may still be perused with interest and advantage by the student and practitioner. His literary information also is very correct and extensive.

As if the work of Borsieri, scientific, precise, and comprehensive as it was, had not been sufficient for the medical schools of Italy, or probably because it was too minute and too lengthened, Francis Vacca Berlinghieri, at that time professor in the university of Pisa, published, in 1794, in that city, a compendious but usfeul elementary digest of practical medicine, chiefly for the purpose of initiating students in the elements of the art of healing. It is not without interest that we are informed of the reasons for the publication of this small treatise.

" In the schools of medicine," says Vacca, " there is still wanting a book which gives clear and definite notions for recognizing and distinguishing from each other the different individual diseases; which specifies the symptoms, equivocal or certain, indicating the changes and the favourable or unfavourable termination; and finally, which furnishes rules to be observed in the cure, sanctioned by experience, and distinguished from those dictated by opinion and hypothesis.

" The many treatises which we have on this subject are more or less defective, and fill the heads of medical students with false, obscure, and pernicious ideas.

" This work will not contain any source of errors. Nothing shall be stated in it as certain, unless fact has shown it to be uniformly such; it shall keep as remotely as possibly from conjectures; but if any shall be proposed they shall be stated under the aspect of conjectures. The inseparable symptoms of each disease shall be described; and those which are sometimes accidentally conjoined with them shall be mentioned,—a distinction most necessary, and which, having being omitted by the most celebrated writers, causes obscurity, uncertainty, and confusion, in the diagnosis of diseases. Care shall be taken to specify those diseases which may be certainly subdued by art, and those which are chiefly to be overcome by the powers of nature.

" Finally, we shall mention the provisions and auxiliary means which are experimentally known to be capable of themselves of subduing diseases, or of aiding the powers of nature in eradicating them. This shall be preceded by a statement of the sypmtoms which in all diseases denote that the termination is to be favourable or fatal."

Vacca adds, that, in the exposition of the diseases attacking the human frame, he will not adopt any nosological system, because the classification of diseases then received in the schools is not only not of that importance and utility which is commonly supposed, but often proves pernicious, and always presents an obstacle to the progress of the science and of the acquisition of skill in the arts.

Agreeably to the resolution here stated, this work of Vacca may be said to present scarcely any systematic method of arrangement. The work consists of two small volumes post 8vo. first, 200 pages, the second, 194. The author treats, first, of the diseases of the nervous system, as apoplexy, palsy, epilepsy, mania, nostalgia, &c.; then a few diseases of the lungs and heart; then at greater length, and in more detail, of the disorders referred to the chylopoietic and assistant chylopoietic viscera; and last of inflammation and the different sorts of fevers;—which concludes the first volume. He then treats in the second of gout, rickets, scrofula, cachexia, venereal disorders and their effects, scurvy, elephantiasis, and leprosy, pellagra, bronchocele, and cretinism, the diseases produced by poisons, mineral, vegetable, and animal, rabies, various chronic diseases, epidemic diseases; the books necessary to form a learned, skilful, and efficient physician; explanation of terms, and finally, a short compendious system of materia medica.*

This is a good and useful compendium of knowledge on the practice of physic, as it then stood. But our readers will not be surprised when we say that, notwithstanding the professions and resolutions of the excellent author, the diagnosis of diseases was not rendered more easy, nor the treatment more efficient after than before the publication of the work of Vacca.

The same year in which Vacca's work appeared in Italy, witnessed in England the publication of the first volume of a work much more ample, and of which the second volume appeared in 1796. This work, on which its author conferred the imposing title of ZOONOMIA, or the Laws regulating Organic Life, was intended, not so much to form a system of practice, as by presenting the facts belonging to animal life, as its author expresses it, reduced to classes, orders, genera, and species, and comparing them with each other, to unravel the theory of diseases;—in other words, to create a system of general and special pathology, founded on the author's peculiar physiological principles. This work contains an immense number and variety of facts illustrative of various physiological and pathological phenomena—not always new or original, but, nevertheless, curious and instructive; and not arranged in a very convenient order for distinct or easy comprehension. Although the contents of the work are not very methodically arranged, or the method of arrangement very strictly observed, nor do the titles of the sections always indicate accurately their subjects, the work consists, or was intended to consist, of four parts. The first is physiological and pathological, and presents a view of the phenomena illustrating the principal laws regulating the healthy vital actions, and the modes in which they are supposed to be most commonly disordered. At the close of this division, Dr Darwin distinguishes all diseases into four great classes—those of irritation, those of sensation, those of volition, and those of association. In the third part of the work he gives a classification of the articles of the materia medica under the following seven heads : — *Nutrientia*, *Incitantia*, *Secernentia*, *Sorbentia*, *Invertentia*, *Revertentia*, *Torpentia*. The terms are neither classically nor scientifically correct ; but Dr Darwin had ingenuity enough to arrange under one or other of these heads the multiplied remedial agents of modern medicine.

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* Codice Elementare di Medicina Pratica Sanzionata dall' Esperienza per Conoscere e Curare i Mali Particolari del Corpo Umano. Di Francesco Vacca Berlinghieri, Professore dell Universita di Pisa, Tom. i. et ii. Pisa, 1794.

The rest of the work, viz. the second volume, might be regarded as the Special Pathology and Special Therapeutics ; for there Dr Darwin entered into the detailed exposition and illustration of the orders, genera, and species of his nosological system ; and considers not only the nature of individual diseases, but the means calculated to effect their removal. It would exceed much the limits of this article, either to give an account of this system, or to examine it critically. Its views, which were striking and original, became popular and rather interesting ; and though practical physicians were not much under the influence of its principles, every one was eager to show his acquaintance with a system which seemed to be deeply imbued with the spirit of philosophy. In 1798 its principles were carefully examined by a young Edinburgh student, physician he could scarcely as yet be termed,[*] who was so much the more competent to the task, that he united to an extensive and correct knowledge of his profession, such as it was then taught,—a peculiar aptitude for metaphysical inquiries,—a truly philosophical turn of mind,—a faculty of psychological analysis rarely equalled, and a power almost unrivalled of placing the most obscure and complicated questions in the clearest light. The physiological theory of Darwin was shown to be vitiated throughout by doctrines tending to materialism ; and when his principles were pursued to their full length, they were found to lead to absurdity. An evil not less serious was, that, in the pathological part of his work, by converting symptoms into diseases, the number of the latter was multiplied to infinity ; and, by taking partial and limited views of various morbid phenomena, without attempting to consider whether they were referable to general heads, in short, by overlooking the important principle, that Nature is ever simple and sparing in causes, but complicated and profuse in effects, he contributed to throw the whole science of pathology into obscurity, confusion, and contradiction.[†]

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[*] Thomas Brown was only 18 when he wrote the observations on the Zoonomia.

[†] Zoonomia ; or the Laws of Organic Life, in four volumes 8vo. By Erasmus Darwin, M. D , F. R. S. The third edition, corrected, London, 1801.

The work, nevertheless, went to three editions; the first and second in quarto, and the third in octavo, and enjoyed for eight or ten years considerable reputation. It has now fallen into undeserved neglect; for, though it can never be spoken of as a guide to the physician, it contains many curious and interesting views, and will always be read with interest by the medical philosopher. It is useful even in showing the wanderings of a great mind.

At the close of the work is a theory of fever, to which the author applies the designation of sympathetic, and in the developement and illustration of which the author brings forward many curious principles and facts.

Selle next published at Berlin in 1797, under the title of *Medicina Clinica*, or manual of Medical Practice, a very good system, which was afterwards translated into Latin by Sprengel; and soon after John Peter Frank began, in 1799, to publish his voluminous work *de Curandis Hominum Morbis*, which, amidst many changes, and a long series of years, has maintained a very high character as a systematic collection of information in medical pathology and therapeutics.

Between the years 1797 and 1801, John Christian Reil, Professor at Halle, published, under the name of Fieberlehre, or the Doctrine of Fevers, and upon the Knowledge and Treatment of Fevers, four volumes,—not, as might be imagined, on febrile disorders alone, but on all the febrile and inflammatory diseases most usually occurring in practice, and most commonly demanding treatment,—all the derangements in the functions of secretion and excretion, whether dependent on disordered action of the glands, or on more general causes, and the whole of the diseases of the nervous system.*

In this work Reil delivers the history, pathology, and treatment not only of the fevers generally allowed to be primary or idiopathic, but of the most important inflammatory disorders, as the different kinds of cynanche, laryngitis, tracheal and bronchial inflammation, pneumonia, and hepatitis; all the hemorrhagic diseases, as epistaxis, hemoptysis, hæmaturia, hæmatemesis, hæmorrhois, and metrorrhagia; then under the head of diseases of the vital energy of the secreting and excreting organs, all those increased or perverted secretions in which the discharges have been unwontedly augmented or diminished, as *polygalia* and *agalactia*, *ephidrosis*, bilious, or gastric fever, diabetes; *blennorrhœa* and mucous diarrhœa, and other diseases of the mucous surfaces. In his fourth and last volume, which is devoted to the diseases of the nervous system, after giving a view of the physiology of the nervous system, and explaining, at great length, the nature of the causes and phenomena and treatment of nervous diseases in general, he presents, under the denomination of disorders of the mind, a very ample and interesting account of the various forms of mental derangement, and the appropriate methods of cure. He then devotes a chapter to the subject of nightmare; and concludes the volume and the work with a short account of those nervous diseases which manifest their presence by abnormal action, whether in exaltation, depression, or alteration in the nervous energy.

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* Johann Christian Reil ueber die Erkenntniss und Cur Der Fieber. Zweyte Auflage. Halle, 1799—1805, Vier Bande.

This last volume of the work of Reil is original and interesting; and had it been published by itself, instead of forming part of a System of Practice of Physic, it would doubtless have attracted much more attention. We find here the first good and collected account of spectral illusions and other hallucinations of sense. We find psychological principles as well as physiological and pathological, employed to explain the phenomena and varieties of mental derangement. And in this volume we find, if not the first recommendation of moral treatment in the management of the insane, at least the clearest, the strongest, and the most philosophical inculcation of that method of management.

About the same time, viz. in 1798, Pinel first published, in two volumes octavo, his Philosophical Nosography, a work certainly of considerable merit as a philosophical treatise on nosology, pathology, and therapeutics, but of much higher pretensions than the dispassionate suffrages of posterity have justified. It was enlarged afterwards, and perhaps it may be said, without injustice, to be improved in the second, third, and fourth editions; the last of which appeared in three volumes in 1810.* With many excellencies it is extremely unequal. Of some diseases the descriptions are full and minute to prolixity for such a work; and of others the accounts are meagre, desultory, and unsatisfactory. In perusing it the idea involuntarily and insensibly arises in the mind that it is not all the work of Pinel, and that in various parts he must have delegated the duty of composition and description to others, certainly not superior hands. It was, nevertheless, for the time a good book; but it has shared the fate of many other works which are written for the day and the fashion of the day. It was the first work in which the principles of pathology and morbid action were unfolded according as they are influenced by the textures in which they are seated, and this circumstance will perhaps constitute its strongest and most permanent claim upon the respect of posterity. As an account of this work is given in our ninth volume, we refer to that for more specific information.

Not long after the appearance of the first edition of Pinel, in 1801, M. Petit-Radel published, in two volumes octavo, a work entitled Institutions of Medicine, which was intended to present a summary of medical theory and practice of the day, and which is often mentioned as a system of practical medicine. This treatise never attained much celebrity, and the knowledge of its existence is confined chiefly to the countrymen of its author. It contains, however, a useful syncretical view of the physiology of the day, from Haller, Whytt, Cullen, Bordeu, Hunter, and Spallanzani; an exposition of the nosological system of Macbride; and sketches of the pathological principles and practice of Cullen.[*]

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* Nosographie Philosophique, ou la Methode d'Analyse appliquée a la Medecine. Par Ph. Pinel, Medecin consultant, &c. 4trieme edition, Tome i. ii. iii. Paris, 1810.

During the same period two works on this subject appeared in Germany. The first was a manual on the knowledge and the treatment of the Internal Diseases of the Human Body, by John Christian Stark, published in 1799 and 1800, at Jena, in two parts or divisions. The materials of this performance were professed to be derived mostly from personal observation and clinical experience.[†] This was followed by the System of Practical Medicine of Hufeland, published in two parts, in 1801 and 1802, at Frankfort, and which was in a subsequent edition enlarged to three parts in 1818.[‡] This work is, properly speaking, divided into two parts or volumes. The first is devoted to general therapeutics solely. The second, which is devoted to the subject of special therapeutics, is subdivided into two parts, in the first of which the author treats of the idiopathic fevers, and the local inflammations; and in the second of cutaneous diseases and poisons.

While Pinel and Petit-Radel were endeavouring to enlighten their brethren in France on the subject of practical medicine, and Stark and Hufeland in Germany, Dr Robert Thomas published in England a compendious view of the principal diseases incident to the human body, and their best known methods of treatment. This work, which first appeared in 1802, was not remarkable either for methodical arrangement, philosophical views, or much originality. It was, indeed, what it professed to be, a mere practical compendium. The arrangement, if arrangement it could be said to possess, was mostly founded on that of the nosology of Cullen; the descriptions of most of the diseases were drawn or rather copied from the First Lines of that author; and the methods of treatment were generally those of Cullen, divested of their philosophical and perhaps less intelligible form, and placed in such terms that they could be easily understood by practitioners. A valuable part of the work, however, consisted in the fact, that Dr Thomas had introduced, from many different practical works, a great deal of useful information, both on the pathology and treatment of many diseases; improvements which had taken place in the gradual progress of the healing art since the time of Cullen. By persevering in this manner,—inserting from time to time such improvements as were annually furnished, by the labours and experience of many practitioners, and introducing frequent amendments and rectifications, Dr Thomas made his work, in ten successive editions, one of very considerable value to the practitioner, if not of high authority. It has, nevertheless, never been regarded in any other light than that of a convenient and accessible compendium, useful in initiating beginners and advantageous for consultation to the practitioner. Its great defect is its total want of general principles or any thing like philosophical views, either on the nature of diseases or their treatment.

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[*] Institutions de la Medecine, ou Exposé sur la Theorie et la Pratique de cette Science d'Apres les Auteurs Anciens et Modernes, &c. Par Ph. Petit-Radel, Dr. et Prof. Deux Tomes 8vo. Paris, 1801.

[†] Johann Christian Stark, Handbuch zur Kenntniss, und Heilung innerer Krankheiten des menschlichen Körpers, vorzuglich aus Eigenen Beobachtungen und Erfahrungen am Krankenbette gezogen. ii. Theile gr. 8vo. Jena, 1799.

[‡] Christopher Wilhelm Hufeland, System der Practischen Heilkunde Ein Handbuch fur Academischen Vorlesungen und fur den pract. Gebrauch, 3 Theile, Jena, 1818.

Between 1804 or 1805 and 1809, another work on the Practice of Medicine, appeared in Germany at Erfurt, from the pen of Augustus Frederic Hecker. This work appears to have acquired considerable reputation; for in 1818 it had gone to a fifth edition, published, not indeed by the author, but by J. S. Bernhardi. In its first form this work consisted only of two parts or volumes.* In its enlarged form in the fifth edition it consisted of five volumes or parts, the last three of which were entirely new. The first part or volume of this work is devoted, after a short view of the theories, systems, and therapeutic methods from the time of Hippocrates, to the developement of the general principles of the knowledge of the treatment of diseases, and to that of fevers, inflammations, and hemorrhages. In the second volume, the author considers the pathology and treatment of catarrhal and rheumatic disorders, the eruptive fevers, chronic diseases, and concludes with a view of the literature of practical medicine. The third and fourth volumes form a system of materia medica; and the fifth is devoted to the subject of the terminations of diseases, and the means of prognosticating the nature of these terminations.

An interval of several years followed, during which, it may be understood, from what has been already said, that the chief works employed as manuals or guides in communicating the knowledge of the principles and practice of medicine were new editions of one or other of those already enumerated. Three works, however, appeared, which, by their comprehensiveness or by their accuracy of their views, deserve particular notice.

The work of John Peter Frank, *de Curandis Hominum Morbis*, formerly noticed, always maintained a high character as a body of information on practical medicine; and it had been enlarged, or rather completed and improved by the author, with the addition of all the information which fifteen or twenty years of increased observation and experience could furnish, and in this character, was published in 1811 at Milan in eleven volumes. It was a work in so general request through the empire, that it was translated into German,—the first six volumes under the inspection of the author, and republished as a new edition at Manheim in 1811,—afterwards in 1829 and 1830, in nine volumes; and also into the French language between 1820 and 1828. Another German translation of the same work, by J. F. Sobernheim, with a preface by Hufeland, was published at Berlin between 1830 and 1834 in ten volumes octavo ; and this edition, which was professedly different from the previous one throughout, was understood to be the most complete and the most correct, though published long after the death of the author, which took place in April 1821. This work, indeed, for extensive and accurate literary information, for correct and faithful description of diseases, for just pathological and therapeutic views, has been for more than thirty years considered as the most complete treatise on practical medicine in the German empire, and the Italian states under the Austrian government; and its supremacy in this respect was only shared by a similar work of the son of this physician, to which we are presently to direct attention.

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* Aug. Fred. Hecker Kunst die Krankheiten der Menschen zu heilen, nach den neuesten Verbesserungen in der Arzneywissenschaft. Erfurt, 1804–1809, 5 Auflage, 5 Theile, gr. 8vo. Gotha, 1818–1830.

In the last German edition of this work, in ten volumes octavo, which may be regarded as the most complete form in which it has appeared, the different classes of diseases are considered in the following order. The first volume is devoted to the subject of fevers reputed idiopathic. The second treats of the acute inflammatory disorders, excluding, however, all those which give rise to discharges of blood or mucus. In the third volume, the acute cutaneous eruptions, *(Exanthemata)* ; and in the fourth, the chronic cutaneous disorders *(Impetigines)* are considered. The next three volumes are devoted to the history, pathological and therapeutic, of the *Profluvia*, or morbid discharges; the fifth volume being appropriated to the consideration of those diseases in which the discharges consist of serous or mucous fluids ; the sixth, to the hemorrhages; and the seventh, to those diseases in which the discharges are of a mixed character. The next three volumes, which conclude the work, contain the history, pathology, and treatment of that class of diseases, referred by nosological writers to the head of retentions, *(Epischeses)*; those, namely, in which materials that ought to be discharghed are retained within the system. In the eighth volume, the aeriform and serous retentions are considered,—as emphysema, the dropsical diseases, and retention, or rather non-secretion of urine; in the ninth, the muco-lymphatic retentions; and in the tenth, those diseases in which blood or fatty matters that ought to be excreted, or foreign matters, are retained within the system ; and finally, the tribe of nervous distempers.

This work, which is lengthened and elaborate, contains full and correct information on the pathology and therapeutics of all the most important diseases incident to the human frame. It is not, however, free from the error of most works composed at the time at which it was first published, of adopting two or more principles of arrangement, namely, an anatomico-pathological and a symptomatic; and, consequently, not only converting symptoms into diseases, but making two heads occasionally for one disorder. Another evil is, that it is so voluminous and bulky, and in its descriptive parts so minute and lengthened, that it is not suited for initiating the student, and is rather a work of reference to the physician who has some leisure.

In 1816, however, appeared from the medical school of Vienna, the first volume of a work which promised to be free from the objections now specified, and to be well suited for communicating to the young physician clear and precise ideas on the principles and practice of the art of healing. This was the *Institutiones Practico-Medicæ* of Valentine Ernest Von Hildenbrand, Professor of Clinical Medicine in the University of Vienna. The author of this work died shortly after the publication of the first volume,—a mortifying proof of disappointment in the execution of human plans. But the materials of the work had been left in a state of good arrangement and great forwardness; and the second, third, and fourth volumes were published successively by his son in the years 1821, 1822, and 1825, completing the system, as to the history of the febrile and acute inflammatory diseases, according to the original design of the author.

This work must be placed decidedly at the head of all the systems of modern times, if we regard clearness of methodical arrangement, accuracy in description and distinction, precision of language, and general logical accuracy, as valuable qualities. The work is neither too long nor too brief; the information is at once ample and accurate; and it is composed in a style so plain and perspicuous, that its language is intelligible to all those initiated in the general principles of pathology.

The first volume contains, after some preliminary remarks on systems of medicine, and the divisions of diseases, a succinct and clear exposition of the general history of fevers. In the second, are explained the history, pathology, and treatment of agues, and the general doctrine concerning inflammatory fevers and inflammations in general. The third volume contains the semiography, pathology, and treatment of the local inflammatory diseases, under two general sections, 1*st*, Those attended with phlegmonous inflammations; and 2*d*, Those attended with specific inflammations, referring to this head the catarrhal, rheumatic, and erysipelatous inflammations. The fourth and last volume contains the exposition of the nosological history, the pathology, and the treatment of the eruptive fevers, and acute or febrile eruptions, including not only the ordinary cutaneous eruptions, but those dependent on, or believed to depend on contagious poisons; inflammatory diseases dependent on poisons; the continued fevers, and hectic fevers.

As this last volume differs more than any of the others from the usual systems, in its arrangement, divisions, and distinctions, and as it is more original in pathological views than any other, it may not be unseasonable to advert shortly to its leading peculiarities.

Hildenbrand divides the cutaneous eruptions into two great tribes, 1*st*, The common exanthemata, as roseola, nettle-rash, miliary eruption, shingles, and boils; and 2*d*, The specific exanthemata, or eruptions connected with fever and inflammation, specific in cause. The latter he distinguishes into two subordinate families; the first, embracing those febrile or inflammatory eruptions dependent on the operation of contagious miasms; and the second, including those febrile or inflammatory diseases dependent on the operation of poisonous agents.

As preliminary to the consideration of the first family of diseases, he gives a general view of the physiology of contagion. To all these, which are the product, in general, of organic bodies, he applies the general name of miasma or polluting principle; and among these he ranges mephites or mephitic exhalations of all kinds, which are the product of organic bodies, vegetable and animal, living and dead, in whatever mode these may be restored into their elements. *Mephitis*, he distinguishes into three species, according to the sources from which the exhalation proceeds; *a. Animal Mephitis*, subdivided into three varieties, α *Cadaveric* or *Putrefactive Mephitis*, from the decomposition of whole bodies, or individual portions of bodies, as masses of animal matters, viscera, &c.; β. *Excrementitial Mephitis*, emanations from the excrementitial matters of the animal body in a state of health; and γ. *morbid excrementitial Mephitis*, or those emanations or exhalations which issue from the body in a state of sickness, or from any of its morbid processes, as purulent or ichorous matter, or lymph in a state of degeneration; *b. Vegetable Mephitis*, or exhalations from vegetable bodies in the same three-fold condition of health, sickness, and death; and, thirdly, *c. Mixed Mephitis*, of which the chief form is that issuing from marshes on the banks of rivers and lakes, the *Mephitis paludosa* or marsh miasma of other authors.

Next come the organic poisons, that is, substances which, produced either by animal or vegetable matters, act on the animal body with such deleterious and detrimental effects, as either to suspend or destroy functions, or destroy texture to sufficient amount to put an end to vital action.

In the third subordinate group come the contagions, which are divided into two sections, the perfect and imperfect.

The perfect contagions are either the migratory contagions and the volatile contagions, which are propagated not only by contact, but by the atmosphere, and, therefore, may prevail as extensive epidemic distempers, and which also produce the febrile eruptions, as small-pox, chicken-pox, *Morbilli*, scarlet fever, *Rubeola*, common contagious typhus, anthracic typhus or plague, and yellow fever, or icteroid typhus; and lues bovilla, and cow-pox;—or the fixed contagions, that is, those which are not propagated by the atmosphere, but by contact alone; and hence do not produce pestilential epidemics, including syphilis, leprosy, elephantiasis, yaws, itch, Polish plait, and in the lower animals, the sheep-pox.

The imperfect contagions are of different sorts. 1. They may belong to the head of catarrhal distempers, that is, those affecting chiefly the mucous surfaces, as purulent ophthalmy, croup, hooping cough, camp dysentery, virulent gonorrhœa and aphtha. 2. They may consist in various ulcerative or gangrenous disorders, as pulmonary consumption in its colliquative stage, malignant ulcers, porrigo or scald-head, and cancerous ulceration; putrid fever, tropical bilious fever, hospital gangrene, scurvy, and scorbutic ulcers, and the malignant pustule. To another division of the same head he refers sundry distempers incident to the lower animals, which, though not originally or essentially contagious, may, under unfavourable circumstances, acquire this property. These may either be epizootic, or epizootic and contagious. As examples he adduces the anthracoid fevers of horned cattle, the milzbrand of the Germans, the glanders among horses, and rabies among dogs.

Hildenbrand then gives a history of the evolution or developement of contagions, and considers the circumstances most favourable to their developement; specifies the different modes in which different contagions are diffused and propagated; the channels by which their materials are most usually introduced into the economy; infection or their operation on the living body, and its organs and fluids; the morbid process which different contagions excite in the peripheral, that is, the remote organs, as the skin, mucous surfaces, and different glands; and lastly, the nature of contagions, and the theory of infection thence deducible.

This is followed by a general nosographical view of the phenomena and effects of contagious fevers, their rise, progress, decline, and terminations, anomalies in their course and terminations, and their therapeutic management, prophylactic and curative.

He then enters on the particular history of the individual contagions and contagious fevers, or the volatile or migratory contagions. These he distributes into three large families; I. the pustulating, or pyogenetic contagions; as small-pox, chicken-pox, cow-pox; II. the purpurating, phoenikistic, or rubefacient contagions, as *morbilli*, scarlet fever, and rubeola; and III. the methystic or stupifying, or intoxicating contagions, which operate principally on the nervous system like a narcotic poison or intoxicating liquor, including the common or eruptive typhus, the pestilential or anthracic typhus, or plague, and the yellow fever of the West Indies.

It is important to observe that in this outline and its completion, the work of Hildenbrand presents two remarkable peculiarities.

*First*, after the example of several of the foreign physicians, he makes of *morbilli* and *rubeola* not one, but two separate and distinct diseases. The term *morbilli* he employs solely and exclusively to designate the disease denominated measles, and follows the example of Selle, Orlow, Strohmayer, Heim, and several other authors in distinguishing it from a similar eruptive disease to which they conceive the name of *rubeola* is more properly restricted. Selle had long ago described *morbilli* and *rubeola* as two separate eruptive diseases. Orlow had, in 1785, in a dissertation maintained the difference, and specified the differential symptoms between *morbilli* or measles, and *rotheln*, or the red-spotted eruption. Strohmayer, in 1806, published also a dissertation on the difference between the two diseases; and Heim had, 1812, in a paper in Hufeland's Journal, maintained the same difference, and specified the diagnostic marks.

Hildenbrand represents *rubeola* to differ from measles, by holding a sort of intermediate place between measles and scarlet fever; by presenting a more decided and severe affection of the throat than is observed in measles; by the throat exhaling the fishy or heavy animal odour observed in scarlet fever, while the eruption is not continuous, but in spots; by the eruption appearing all at once on the third or fourth day over the person, but sparingly on the face; and by the eruption appearing in red spots, gradually becoming pale from the centre to the circumference, similar to spots left by drops of red ink, which had fallen on thin paper previously moistened. By the appearance of the rash, and the presence of catarrhal or bronchitic symptoms, and its tendency to leave behind it various morbid states of the lungs, the *rubeola*, according to Hildenbrand, shows its affinity to measles (*morbilli.*) But, on the other hand, by the inflammatory state of the throat, by the intense redness of the skin, and the mode of desquamation, by the peculiar odour of the transpiration, by the tendency to dropsy, and the prevalence of scarlet fever at the same time, and in the same neighbourhood, the disease evinces its connection with scarlet fever.

For a minute account of these distinctions we refer to the paper of our intelligent correspondent, Dr Robert Paterson, who, in our fifty-third volume, described the rotheln as it appeared in Leith.

In the *second* place, the reader will understand that Hildenbrand withdraws typhous fever from its usual position with the continued fevers, and places it among the acute cutaneous eruptive disorders; nay, he here arranges both typhous fever of this and other European countries, oriental plague, and the yellow fever of the West Indies with the eruptive contagions. This was first done by the elder Hildenbrand as to the former, from the circumstance of observing the disease to be most frequently, if not invariably attended with an eruption of stigmata or reddish rose-coloured measle-like spots; and, so far as the usual typhus of European countries is concerned, this nosological position of the disorder cannot be very much objected to; nor, perhaps, can it be said that plague is not properly referred to the same head. But it is by no means so clear to us that yellow fever, in which a cutaneous eruption is neither a frequent nor a constant symptom, should with the same justice be placed in the same position.

This section is followed by the second division, or the poisonous inflammations, that is to say, the history of those inflammatory disorders which ensue on the application of any of the poisons, animal, vegetable, or mineral.

Under the third subsection, are treated inflammations, specific as to diathesis, including two sub-genera, viz. simple putrid fever, which the author distinguishes altogether from typhus; and the accompanied putrid fevers, including water-kanker, malignant angina, carbuncle, and hospital gangrene; as a third genus, the nervous fevers, which the author also distinguishes from typhus fevers; as a fourth genus, the gastric fevers, the bilious fevers, the gastro-hepatic fevers, the gastro-enteric, and the verminose or worm fevers; and as a fifth, the hectic fevers, embracing not fewer than ten varieties.

This work, however, is chiefly a system of pyretology; and the author's son admits that, though they have attempted to deliver a full history of the pyrectic or febrile and inflammatory disorders, as preliminary and introductory to the second large class of diseases, namely, those of plastic life, yet they have not furnished a complete system of the institutions of practical medicine. There is, in short, a large and important class of diseases, those which may be called complex, because they rarely consist of one lesion, and because often they are the effects of simple lesions, and many of which are chronic, upon the history of which in this work Hildenbrand has not in any way entered. These, however, he announces his intention to treat on a subsequent occasion.[*]

A system of pathological and therapeutic knowledge more extensive and more complete, was the *Praxeos Medicæ Universæ Praecepta* of Joseph Frank, which appeared in successive portions between 1821 and 1835. The intention of the author was to have published the work in four parts, each consisting of two volumes; but to this he did not adhere throughout; the first part consisting of three volumes, the second of eight volumes, the third of only one volume; while, so far as we are aware, no part of the fourth volume has yet appeared. It is probable that the author found it inexpedient if not impracticable to adhere to the arrangement which he had originally planned; and that the conviction of the necessity of giving full and complete views of the pathological and semiographical history, as also of the treatment of the multiplied diseases assailing the human frame, made him feel the necessity of not following very closely any systematic or methodical arrangement. One thing is certain, that in this work there is, with much explicitness and amplitude of information, much less adherence to any of the usual systems than in any other treatise. In truth, it may be said to present scarcely any arrangement whatever, except that of the anatomical contiguity and connection of organs and parts. There is another character almost peculiar to this work, that the author gives of the numerous and important class of complex maladies, the best descriptions and delineations, etiological and pathological, extant.[*]

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[*] Valentini Nobilis ab Hildenbrand Caesar. Reg. ad Regimen Austriæ Inferioris Consiliarii, Praxeos Clinicae in Universitate Vindobonensi Professoris, &c., Institutiones Practico-Medicæ Rudimenta Nosologiae et Therapiae Specialis complectens. Tom. i. Viennae, 1816. Edidit, redegit, ac propriis lectionibus accommodavit Filius Franciscus Nobilis ab Hildenbrand, M. D., &c. Tom. ii. 1821, Tom, iii, 1822. Tom, iv. 1825.

The only other work of this kind to be at present mentioned, is the Manual of Special Medical Pathology and Therapeutics by John Nep. Edler von Raimann. This treatise, originally published in 1816 and 1817 at Vienna, in two volumes 8vo, is one of considerable merit as a manual. Though less voluminous and lengthened than either of the two last mentioned works, and though by no means comparable to them in learning, detail, or amplitude of information, it is a valuable compendium, useful and much used in Germany, and had gone to the fourth edition in 1831, besides one Latin edition in 1835.[†]

Dr George Gregory of London published, in 1820–23, a short system of Practice, which has been enlarged and improved in three editions. It is a respectable compilation, and well suited for initiating the student in the principles of the art of recognizing and curing diseases,

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[*] Praxeos Medicae Universae Praecepta Auctore Josepho Frank August. Imp. et totius Rossiæ Autocratori a Consiliis Aulicis, Equite orde 11 Wlodimir iv. class. Therapiæ Specialis et Clinices in Caesarea Universitate Vilnensi Professori, &c. Editio secunda. Taurini, 1821, 1835. Pars i. ii. iii.—xi. vol.

[†] Johan. Nep. Edler c. Raimann Handbuch der Speciellen Medicin. Pathologie und Therapie, fur akademische Vorlesungen bearb. 2 Bande, 4e Auflage. Wien (1816, 1817,) 1831, and Principia Pathologiae ac Therapiae Specialis medicae, usui academico accommodata. Edit. Latina ii. Tom. 8 maj. Viennae, 1833.

Of the system of Dr Mason Good, we have spoken fully in our nineteenth and twenty-fifth volumes.

This general view of works on Medical Practice we have thought proper to premise to the notice which we are now to take of the work, the title of which is prefixed to this article.

The present volume is the first part of a work which we are led from the preface to understand is to be completed in one other volume. It contains the history of the febrile and inflammatory disorders. It is the joint production of two hospital physicians, eminent for experience and clinical observation, and one of whom has acquired a reputation of the first and most brilliant rank by the number and value of his labours in morbid anatomy and pathology. This is a great advantage to the present work, and ought to enhance its value in the eyes of all competent judges; for while hospital physicians certainly are on the whole most likely to execute an undertaking of this kind in a manner useful to those whom they wish to instruct, it often happens from a variety of causes, that physicians of this class do not, at least in this country, show much disposition to apply their opportunities and means of information for the purpose of composing elementary works for the instruction of their junior and less experienced brethren; and hence the duty is often left to others whose qualifications in all other respects may be excellent, but who still want the means of acquiring pathological knowledge, and of appreciating the value of different methods of treatment furnished by the wards of a large hospital.

For these reasons the present work comes before the profession with very strong recommendations and high claims upon attention. It may be described as an elementary treatise almost wholly practical, that is, containing only those points most necessary to be known in order to enable the student to recognize the presence, and know how to conduct the treatment of diseases. The authors, in the original conception of their work, had intended to exclude all theoretical discussions, or at most, to introduce only so much theory as was indispensable to render the various subjects intelligible to the student, without entering at large upon controversial points, or pretending to bring forward novel views or striking doctrines. To this resolution they have adhered only in part. They found it, as might have been anticipated, difficult, nay, impracticable to avoid all theoretical discussions; and accordingly we find not only a theory of fever, but some theoretical observations on inflammation. This might have been anticipated, and we are only astonished that two physicians, so sensible and experienced as the present authors, should imagine that it was possible to exclude theoretical views altogether from such a work. The truth is, that it is not theory which is objectionable so much as hypothesis; and though it is desirable that all bad, false, or insufficient theories, and all hypothetical speculations whatever, should be excluded from a work on practical medicine, it is neither desirable nor proper to exclude good and rational theory. Medicine is, like all other arts, one in which it is necessary to reason or draw inferences from a certain number of facts; and so long as this is requisite, it is utterly impossible to discard theory, which is merely reasoning from a certain number of facts. The great point is to keep the theoretical parts as much as possible separate from the facts, to state the facts clearly and methodically, and then to show to what extent the facts may be applied in establishing sound and rational theoretical conclusions.

The arrangement of the present work is not according to any system or principle, and appears to be of the simplest nature. The authors begin with a general description or definition rather of fever, and proceed at once to the history of the idiopathic fevers, describing successively intermittent fever, remittent fever, infantile remittent fever, and continued fever, and concluding with the theory of fever. Then follow inflammation and inflammatory fever; the history of the inflammatory diseases of the lungs and heart; the history of the irritative and inflammatory diseases of the cerebral membranes and the brain; that of the inflammatory disorders of the throat and the contiguous parts; that of the inflammatory diseases of the abdominal viscera and membranes; *Nephritis* and *Cystitis*; and lastly, the semiographical history of rheumatism and gout.

It would much exceed the limits within which this notice must be confined, were we to take even a very general view of the mode in which the authors have treated these different subjects. It is sufficient to say that their semiographical descriptions are very clearly and shortly given, that the pathological portions are, as might be expected, correct and instructive, and that their therapeutic directions are always safe and efficient. To a few only of the principal subjects we shall direct attention as specimens of the manner in which the work is composed.

We have said that the present volume presents scarcely any methodical arrangement, at least none in which the individual diseases are related by any general principles of alliance or connection. Its greatest error in this point of view is that of placing infantile remittent fever immediately after remittent fever among idiopathic febrile maladies. We certainly think that either the accidental coincidence of the name or some similar cause has procured for it this distinction; for if the symptoms and the pathological cause of these symptoms be considered, it must obviously appear that it is not an idiopathic febrile disorder, and that the febrile symptoms depend upon some morbid state either in the circulation or the secretions of the alimentary canal, and that, consequently, the disease should have with greater propriety been classified with disorders of the alimentary canal.

The following is the account of the early symptoms.

> "The drooping and listlessness of the child, the muddy or pale face, the languid expression, the dark areola around the eyes, and the dilated or unsteady pupil, at once arrest the attention of the observant practitioner, who, on inquiry, is usually informed that the child, without any assignable cause, began to droop and waste in flesh; that its appetite is impaired, voracious, or capricious; that it occasionally complains of pain in its stomach or head; and that the alvine discharges are offensive and of a dark, pale, green, slate, or clay colour; that the child moans, starts, or grinds its teeth during the night; and that it picks its nose during the day. On examination, the tongue is usually found coated with a white mucus, most considerable towards the base; the belly more or less distended; and the breath nauseous or otherwise offensive."—P. 63.

On its pathological nature the sentiments of the authors are given in the following extract.

> "As already observed, it is in all its forms associated with derangement, probably of the abdominal viscera generally, but of the stomach and intestinal canal in particular. With respect to the precise or essential nature of that derangement, we are in possession of no very satisfactory information. The symptoms, and especially the condition of the alvine discharges, abundantly attest the existence of disturbed function and consequent deranged secretion; but how often and how much a state of congestion or of actual inflammatory action takes place, it is much more difficult to determine. It is probable, however, that more or less of inflammatory action does exist in the mucous membrane of the small intestines, whenever febrile exacerbations prevail, and especially when they prevail in an aggravated degree: accordingly, although on dissection we for the most part discover little remarkable, nevertheless, indications of inflammation, or even of ulceration of the mucous membrane of the stomach and small intestines, have now and then been observed."—Pp. 65, 66.

These observations lead directly to the inference, that the infantile remittent fever is symptomatic of different disordered states of the alimentary canal. But if doubt could be entertained on this point, we conceive it must be removed by the following remarks on the disorders, to which these states may give rise.

> "Not the least important circumstance connected with the diseased condition of the body now under consideration is, the vast influence which it exerts in producing, modifying, or predisposing to, other disorders incident to early life. In its most acute febrile form it is now and then observed to cause the abrupt developement of hydrocephalus, and when the fever is less acute or continuous, it

not unfrequently leads to enlargement and obstruction of the mesenteric glands and to consequent tabes. It is the more chronic or apyretic form of the disease, however, which seems to exercise the most powerful and insidious influence in favouring or causing the developement of disease in early life; the form of the disease varying according to the predisposition existing in individual organs or in individual constitutions. It is under such circumstances, that scrofula is so repeatedly observed to show itself, either in the form of diseased mesenteric or lymphatic glands, chronic abscesses, diseased joints, or *phthisis pulmonalis*. It is under similar circumstances that infants have the strophulus; and children, irritable retina, porrigo, impetigo, ecthyma, rupia, or pomphylyx developed; and it is in connection with more or less of this state, that we so often find chorea, and tubercular or hydrocephalic disease of the brain."—P. 67.

In short, we cannot refrain from expressing the opinion, that this disorder would have been more properly placed among those of the alimentary canal.

The therapeutic indications are very judiciously delivered, and show how much attention requires to be given to the different degrees and stages of this disorder.

On the subject of the treatment of continued fever, that is typhous fever, when severe, and protracted to the tenth or twelfth day, without symptoms of amendment or relief, the following observations present a good view of the most efficient mode of treatment.

" The aggravation of the symptoms of fever, as already observed, takes place, for the most part, about the eighth, tenth, or twelfth day, and is generally first indicated by the state of the intellect, by the pulse, by the tongue, and by the loss of muscular power. When at this period, active delirium supervenes, so that the patient becomes violent, talks incessantly, and attempts to get out of bed; when the tongue becomes dry and brown, the pulse frequent and sharp, with a dry parched skin, some form or other of depletion must be attempted; for if not, and especially if cordials be given, the patient will soon pass into a state of stupor, low muttering, with *subsultus tendinum*, and will assuredly die. And even if instead of this excited state we have merely confusion or stupor, we must pursue a somewhat similar course. We would not bleed so freely as at an earlier period, but six, eight, or ten ounces of blood may occasionally be taken from an adult, with decided advantage; the powers of the system speedily rallying after the operation, the delirium subsiding, and the pulse losing its sharpness and becoming more soft and fluent.

" Another valuable remedy under such circumstances, is cold applied to the shaven scalp. For this purpose, a piece of linen rag once folded, may be dipped in some evaporating lotion, applied to the head, and frequently repeated. Equal parts of vinegar and water, or of liquor ammon. acetatis and mist. camphoræ may be used, to a pint to either of which compounds, half-an ounce of sulphuric ether may be added, to promote evaporation and thereby increase the cold. The assiduous application of cold in this way will often speedily allay irritation of the brain and dispose to sleep. In other instances, a blister to the nape of the neck will be found of considerable service.

" The next important part of the treatment in severe fever is attention to the state of the bowels; and experience has shown that, if the unfavourable change be associated with constipation, the mercurial purges ought to be preferred. We have known four or five grains of blue pill given every hour for three hours, and if necessary followed by half-an ounce of castor-oil, produce a most beneficial effect; the general uneasiness being greatly relieved, the tongue getting moist, and the skin relaxing almost immediately after the operation. In other cases, the rhubarb and calomel may be given, or the hydrargyrum c. creta, followed by castor-oil.

" Should the fever have proceeded to about the end of the third week before unfavourable symptoms supervene, the case becomes much more alarming and difficult; for with the exhaustion necessarily incident to this more advanced period of the disorder, we have nevertheless, symptoms which at all times require something analogous to depletion, and are uniformly aggravated by a contrary practice. The increase of languor, the supine and helpless position of the patient, the muttering, the faint cries of distress, the starting of the tendons, picking of the bedclothes, the dull sunken eyes, black, chapped, and dry tongue, parched skin, perhaps livid petechiæ, involuntary stools and rapid compressible but still sharp and wiry pulse, indicate a state, if not of actual inflammation, at least of irritation in important organs, which never fails to be aggravated by tonics and stimulants. And, indeed, it may safely be asserted, that so long as there is a sharpness and smartness in the beat of the pulse, however small and contracted it may be, so long as the skin remains tense and dry, and the tongue dry, parched, and black, tonics and stimulants will almost uniformly be found to prove injurious. Under such circumstances, therefore, a few leeches to the temples, cold lotions to the shaven scalp, or a blister to the nape of the neck, will constitute the principal means that at this period we can recommend for the relief of the brain; whilst here again, special attention must be directed to the state of the bowels.

" Whether these unfavourable symptoms occur early or late, provided it do not greatly irritate the intestines, calomel or some other form of mercury may be given with safety and often with the most marked advantage. A grain of calomel or four grains of hydrarg. c. cretâ may be given three or four times a-day, at the same time employing the bicarbonate of soda mixture as a general medicine. Should the bowels be irritable or relaxed, our first care must be to remove all offending matters by a little powdered rhubarb, or by a few grains of hyd. c. cretâ, followed by a couple of drachms of castor oil, and afterwards endeavour to protect them by combining opium or chalk, or both, with the mercury. Three grains of hyd. c. cretâ may be taken three times a-day, with an ounce of chalk mixture, to which occasionally may be added a few minims of laudanum, or six or ten grains of confect. opii. In some instances the astringents kino and catechu have been successful in preventing the mercury from running off from the bowels, whilst in extreme cases the mercurial inunction has been tried. In every continued fever, however, attended with severe bowel irritation, unless the state of other organs urgently demand it, it will be prudent to abstain from the active use of mercury internally; a caution the more necessary since there is good reason for believing that much of the cerebral disturbance supposed to indicate its use, results secondarily from sympathy with the diseased intestines.

"If, after having carried into effect all necessary depletion and counter-irritation, and clearing the bowels of offending matters, there should obstinately remain a good deal of cerebral disturbance and restlessness, with a moderately soft pulse and loose skin, considerable relief will sometimes result from small and frequent doses of opium. For this purpose eight or ten minims of laudanum, black drop, or liquor *opii sedativus* may be given with from fifteen to thirty minims of vin. ant. tart. in any simple vehicle every two, three, or four hours; the repetition and continuance of the practice being regulated by the effect.

"If, notwithstanding the means recommended, the powers of life begin to fail, there is no alternative but to have recourse to additional support, to stimulants and tonics, of which it may be stated generally that in proportion as the skin becomes pliant or moist, the pulse soft and fluent, and the tongue moist, they may be exhibited with freedom, safety, and advantage. The least equivocal of all our stimulants under such circumstances is unquestionably the sesquicarbonate of ammonia. It seems to rouse the energies of the system without producing that disturbance of the brain which is liable to result from the use of vinous liquors. Five or six grains of it may be given in camphor mixture or any simple vehicle every three or four hours; or it may be administered in an ounce or ounce and half of an infusion of serpentary, made in the proportion of an ounce of the chopped root to a pint of water, and rendered more grateful by a little aromatic tincture. It is much preferable to the cinchona, which seldom fails to prove pernicious in almost every stage of common continued fever. These, with the addition of beef-tea to the former diet, must be chiefly relied upon when great prostration prevails at an advanced period of severe fever. Nevertheless, occasionally a moderate allowance of wine will at the same time be found necessary. The quantity may vary from three to eight or ten ounces in the course of twenty-four hours. It should be slightly diluted, and exhibited in portions of about an ounce every two, three, or four hours, according to the effects produced.

"When the sinking of the vital powers is such as to call for the more powerful stimulants, brandy and ether, the case must be looked upon as all but hopeless; hopeless, because the exhaustion is then for the most part associated with great irritation or actual inflammation of important organs; disturbances which are too often aggravated by all tonics and stimulants."—Pp. 102–106.

The use of sesquicarbonate of ammonia in these states and forms of fever is judicious, and it is a remedy under which patients often recover from very ominous states of weakness. There is one condition in which our own experience has led us to place in its seasonable employment considerable confidence. In persons either with previous irritable lungs or bronchial disorder, or in persons who are labouring under typhus with decided bronchial inflammation, after the employment of a moderate depletion from between the shoulders, the use of sesquicarbonate of ammonia is often most beneficial. The respiration is then laborious, panting, and frequent, (36 to 40); the patient's face is reddish and bloated, or even slightly livescent; the *alae nasi* are in constant motion; through the walls of the chest the vibrations of the sonorous rattles may be felt by the fingers; the extremities are bluish, and perhaps swelled, and above all, the patient cannot cough, in short, is unable to do so. In such cases, if the lungs be not speedily relieved, stupor and subsultus rapidly ensue, the urine is retained, the pulse becomes small, feeble, and intermitting, and the extremities become cold, and the patient dies partly from asphyxia, that is suspended respiration, partly from asphyxial coma. In this class of cases the sesquicarbonate of ammonia is often a most efficacious and present auxiliary; under its use the respiration becomes slower, less laborious, and more full; the complexion becomes clearer, and more natural; the pulse abates in frequency, and recovers strength and firmness; the extremities become warm, and natural in colour; the patient is enabled to cough, and a little expectorated mucus is brought up; and at length recovery begins to be established. In the present work, the remedy is recommended to be given in solution. In our mode of administration, we have generally exhibited it in the form of pill, three or four grains being given every second or third hour.

The descriptions of all kinds, both semiographical and pathological, are in general in this work very accurate; but in the account of the morbid appearances observed in chronic hydrocephalus, is a statement, the accuracy of which to us appears to rest on an uncertain foundation. Among the morbid appearances presented by the disease, it is said, are "effusion of serum, sometimes between the membranes, but much more generally into the ventricles, which become distended in a most enormous degree, communicating freely with each other by the foramen of Monro, which is often large enough to admit the little finger; while the parietes of the ventricles are rendered remarkably firm, often assisted by the thickening of the lining membrane."—P. 385.

Of the existence of the communication here mentioned, there is no doubt in extreme cases of the disease; but that this communication takes place by the opening and enlargement of the *foramen* of Monro, is a point which appears to us extremely doubtful. We have examined a considerable number of cases of chronic hydrocephalus, and of instances of copious effusion within the ventricles; and we do not think that in one could it be said that the communication was through the enlarged foramen of Monro. A communication certainly there was, and it had been effected by means of a hole; but this was not the foramen of Monro, nor in the site of that foramen, but through the *septum lucidum*, which had been perforated to various extents in different cases, to allow of this communication. We have further seen this perforation of the septum pointed out as the enlarged foramen of Monro; but we have always observed, that, if the lower margin or border of it was examined, the fornix was entire, though softened, and the foramen of Monro was of its usual size, and by no means contributed to form the communication between the ventricles. We do not, on this account, altogether deny the possibility of the foramen being enlarged occasionally; but knowing the facility with which the perforated septum has been, and may be mistaken for the enlarged foramen, we respectfully submit to the learned authors whether the communication may not have been effected in the mode we now mention, by the perforation and destruction of the softened septum, rather than by enlargement of the foramen of Monro.

Good accounts are given of the different diseases of the alimentary canal and abdominal viscera. Acute *enteritis* and chronic *enteritis* are very fully and amply described; and much pains are taken to give not only correct and faithful delineations of these important and dangerous diseases, but to establish a clear and useful set of diagnostic symptoms. There is given, also, in this volume a short account of inflammation of the cæcum, (*typhlitis*), and vermiform appendix,—a disease on which, so far as we remember, no other elementary work contains any information.

In the treatment of rheumatism by means of meadow-saffron, the authors seem most partial to the administration of the powder of the *cormus*, or root-stem, in doses of four, five, or six grains, in a draught containing ten grains of carbonate and one drachm of sulphate of magnesia, every four or five hours.

It would, however, be idle to enumerate all the meritorious points of this volume. We may say, in general, that it is, so far as it goes, an excellent practical compendium, and contains a great fund of useful pathological knowledge. We hope that the authors will proceed rapidly to finish their second volume, and thus complete the work; for, though the first contains the account of many important and frequently occurring diseases, it is of great moment that the student be provided with a complete treatise by the same author, and that he be not interrupted in his systematic study of the practice of medicine, by the necessity of going to other writings on the same subject.

## Art. II.—*A Treatise on Amaurosis and Amaurotic Affections.* By Edward Octavius Hocken. 8vo. Pp. 359. London, 1840.

Amaurosis, from the variety of causes from which it may arise, and the frequent want of prominent symptoms to indicate the cause in each variety, has been long regarded as one of the most obscure diseases to which the eye is liable. Coming on frequently without any apparent cause, or produced by injury of parts apparently unconnected with the retina, whilst no marked changes are observed in the visible structures of the eye, it has been frequently regarded as a hopeless disease, and its treatment conducted empirically rather than on sound principles. Mr Hocken's treatise is therefore a valuable addition to the works already published on diseases of the eye; for in it the author not only shows an intimate knowledge of the works of previous writers, but he with great perspicuity defines the varieties of amaurosis, specifies the causes which may give rise to it, and the appropriate treatment for each of its forms. The whole is illustrated with numerous cases of the several varieties of the complaint. It forms a complete treatise on this disease, one very much wanted, and deserves a place in every medical library.

. The arrangement which Mr Hocken follows appears well suited for the purpose, being founded on the anatomical characters. The treatise is divided into nine chapters. 1. On the anatomy and physiology of the visual nervous system. 2. The definition of, and general observations on amaurosis, including the symptoms, causes, diagnosis, prognosis, pathological anatomy, and treatment. 3. The classification of amaurosis; and on that form dependent on affections of the retina. 4. On amaurosis from affections of the optic nerves. 5. On amaurosis from affections of the brain. 6. On amaurosis from affections of the visual nervous system, brain, optic nerve, and retina. 7. On amaurosis from affections of the nervous trigeminus. 8. On congenital amaurosis. 9. On amaurotic and nervous affections.

It seems unnecessary to enter into any detail of what the author states regarding the anatomy and physiology of the visual nervous system, unless to say that he is sufficiently minute on all necessary points, with one single exception, which he has somehow overlooked, both in the anatomical details of structure, and in the physiology of the parts. We allude to the twisting of the optic nerves discovered by Professor Alison, and the explanation of the cause why images are seen upright, though represented as inverted on the bottom of the eye. For notices on both of these subjects we refer to the fifty-second volume of this Journal,

(p. 530,) and to the thirteenth volume of the Transactions of the Royal Society of Edinburgh, (p. 472.)

On the disputed point of the decussation of the optic nerves at their commissure, the author does not throw any additional light; but a curious case, singularly illustrative of the opinion of Mr Mayo, has lately been published by Dr O'Bryen of Dublin.* Mr Mayo stated as the result of his investigations, that a partial decussation or crossing of the fibres took place, the rest passing on uninterruptedly to the retina. In Dr O'Bryen's case, a tumour had destroyed the left optic nerve posterior to the commissure, indicated during life by complete loss of vision of the left eye, but only partial loss of that of the right eye.

Mr Hocken defines amaurosis to be "that imperfection or loss of vision which results either from the diminution or the entire loss of nervous sensibility, whether functional or organic, sympathetic or symptomatic." The symptoms he represents to consist in a peculiar appearance of blindness and want of expression, which is attributed to the inability of the patient to direct his eyes to the object he wishes to see. On this character Richter lays great stress as the best for ascertaining whether a person is feigning blindness. The pupil of the eye is found in every varying condition in amaurosis; most commonly the iris is dilated and immoveable, but when arising from chronic *retinitis* may be so much contracted as not to exhibit a pupil larger than the size of a small pin's head. Its mobility varies also; in general the iris moves sluggishly or not at all; in some cases, however, its sensibility appears to be increased. It is directed in all cases to cover the one eye when examining the other, as supposing only one eye is affected, the movements of the iris of the sound eye affect to a certain extent those of the diseased one. Strabismus is mentioned as being common when the disease is confined to one eye only. Oscillatory movements of the eye are also remarked in amaurosis. The eyeball itself is seen in two opposite states, either enlarged, prominent, firm, and resisting to the feel, or sunken, small, and unnaturally soft and yielding.

It is recommended in all cases to ascertain the peculiarities of the case, its exciting causes, its duration, the rapidity with which the symptoms increased, the age, idiosyncrasy, habits and employment of the patient. The forehead, face, and mouth are directed to be particularly examined for the purpose of ascertaining whether any of the branches of the fifth pair of nerves are irritated by a decayed tooth, or from being included in a cicatrix.

Under the head of subjective symptoms, the author mentions the peculiarities of the imperfections of vision, the distortion of objects, the desire for strong mid-day light, the occasional intolerance of light, a symptom generally attributable to the presence of chronic *retinitis*, though it sometimes is independent of such a state. Double vision, or only seeing half of the objects, or in altered colours, together with various spectral illusions, as bright luminous sparks, flashes of light, *muscæ volitantes*, &c. are also noticed under this head.

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* Dublin Journal of the Medical Sciences, January 1841, p. 1. See also the present number of this Journal.

Amaurosis is described as being complete or incomplete, incipient or confirmed. In the incipient stage some degree of vision is retained, and it is in this stage only that remedies are of any avail. When the blindness is complete from the first, the disease is often incurable under any treatment. In the confirmed stage the affection usually ceases to advance, and the sight is rarely entirely lost, a faint perception of light and darkness being still retained.

The causes of amaurosis are various and often complicated. Mr Hocken mentions as causes of this disease, hereditary predisposition, sanguineous congestions, anæmia from excessive evacuations or other causes, over-exertion of the sight, sudden exposure of the eye to excessive light, blows on, or injuries of the head or eye, irritation of the fifth pair of nerves, various poisonous agents, disease of the abdominal viscera, and gouty or rheumatic diathesis.

The pathological conditions of the retina and choroid tunic which produce amaurosis are referred to, 1. Acute and chronic inflammation of the retina and choroid coats. 2. Organic changes the result of hyperæmia of these parts. 3. Pressure operating on the retina. 4. Injury of the retina from blows, wounds, &c. 5. Organic disease commencing in or implicating the retina. 6. Atony of the retina. The pathological conditions of the optic nerve connected with or producing amaurosis are enumerated under the following heads: 1. Inflammation and organic changes resulting therefrom in the optic nerve and its neurilema. 2. Malignant diseases or tumours seated on or near the optic nerve. 3. Injury of the optic nerve. 4. Pressure on the nerve from tumours, &c. The pathological conditions of the parts within the cranium which are capable of producing amaurosis are, 1. Acute and chronic encephalitis and their results. 2. Organic diseases. 3. Disordered circulation within the cranium, and apoplexy. 4. Injury, concussion, fracture or depression. 5. An original defect or arrest of developement in some part of the brain. The pathological conditions of the visual nervous system productive of amaurosis are referred to two opposite conditions of the body, viz. plethora and anæmia, and also to the action of certain poisons, as belladonna, hyoscyamus, &c. Affections of the fifth pair of nerves or of its branches are likewise mentioned as causes of the disease.

The diagnosis of amaurosis is important from its liability to be confounded with incipient cataract or with glaucoma, but particularly as to cataract, for the treatment in the early stages of these two diseases is very different. Mr Hocken specifies the following as the most important diagnostic marks of these diseases. In incipient cataract, the vision is gradually impaired, objects are seen as if a mist or thin cloud intervened, which, as the lens becomes more opaque, gets thicker and thicker till objects are completely hid by it. In amaurosis the vision is either at once lost, or at least the loss of vision is sudden; objects appear distorted, imperfect, double, or covered with motes, flies, or black spots. In cataract, objects are best seen in an oblique direction, and in a dim light which allows the pupil to dilate. Amaurotic patients generally, though not always, see best straight forwards and in a bright light. The mobility of the iris is as great as in health in incipient cataract, but is greatly lost in amaurosis, in which disease there is a slight degree of strabismus, as also a loss of power of motion in the upper eyelid which never occurs in cataract. The vacant expression of the countenance is only met with in amaurosis. It is to be recollected, however, that the two diseases sometimes co-exist. The deep-seated greenish appearance of the pupil, and the altered colour of the iris serve to distinguish glaucoma.

As to the prognosis, it is stated, that the more recent the case is, and the less the injury of the sight, the greater is the chance of recovery. The prognosis is also favourable when the disease depends on debilitating causes. All cases, however, of long standing, or depending on affections of the brain, congenital imperfections of sight, or severe injury of the eye are unfavourable.

The morbid appearances, which are the cause or consequence of amaurosis, are described as consisting of thickening, opacity, and adhesion of the retina to the neighbouring coats; the formation of a shell of bone behind the retina which has been found converted into a white, firm, fibrous membrane. The retina itself, and ciliary bodies have been found converted into bone. The vessels of the choroid membrane and retina have been seen in a varicose state. The medullary fibres of the retina have been observed to be entirely wanting in those who had been long amaurotic. The optic nerves have been noticed in various states of disease, as discoloured, flattened, atrophied, indurated, or softened; their medullary matter in a state of suppuration, or absorbed and replaced by fluid matters, whilst the fibres of the nerves were infiltrated with serum; cysts have been found in their neurilema, or their substance compressed with various tumours. All the morbid conditions of the brain or organic diseases of its membranes, or the compression and irritation arising from disease or injury of the cranial bones may give rise to amaurosis, in certain circumstances, and be therefore enumerated alongst with the other pathological appearances producing amaurosis.

The general treatment of amaurosis is detailed at considerable length. Venesection is recommended in all those cases which are attended with inflammatory action, or with local or general plethora; but it is condemned as highly injurious in all those forms which arise from, or are accompanied by debility, loss of tone of the minute arterial ramifications of the retina, the consequence of prolonged inflammatory action of that tunic, or where there is anæmia or atony of the retina. When it is necessary to abstract blood, it is directed to place the patient in the erect posture, and bleed to incipient syncope. Arteriotomy is justly condemned as an operation apt to be followed by troublesome or even dangerous consequences, and after all in nowise superior to the abstraction of blood from a vein, or by cupping at the nape of the neck or between the shoulders.

Purgative medicines in some form or other are recommended as applicable to nearly all forms of amaurosis. Mercury, however, is the remedy, which, of all others, is considered as the most generally applicable, and the most worthy of confidence in this disease. The object being to prevent the disorganization of the delicate nervous structure by its judicious, persevering, and effective use, calomel and opium in the proportion of two grains of the former, and one-half grain of the latter, is the form recommended in the acute form of amaurosis; whilst the blue pill or Plummer's pill, with or without a narcotic, as conium, is preferred for the chronic form.

This mineral is recommended to be given so as to produce a tender condition of the gums, as evidence of its constitutional action, and the system to be kept under its influence for some time; but if the amaurotic symptoms do not begin to give way when this state is once fully induced, the case is to be considered as hopeless.

Mr Hocken does not advert to a method of administering this mineral in small doses lately recommended by several practitioners both in Ireland and this country. The practice followed consists in dividing five grains of the blue pill mass or one grain of colomel into twelve parts, and giving one of these from every hour to every three hours, according to the urgency of the symptoms and the rapidity with which salivation was desired to be produced. By this mode of exhibition, the mercury does not act on the bowels, but is rapidly absorbed, and produces its peculiar physiological action. By the old plan it was difficult to induce salivation in less than two or three days at the very soonest, sometimes not at all;

by the new mode it may be brought on in from twenty-four to thirty-six hours at the latest. The probable reason why the old practice proved so little to be depended on in inducing mercurial action was that the mercury irritated and acted on the bowels, whilst its absorption was still farther prevented by the addition of opium. By the new mode there is never given at any time such a quantity of the mineral as will produce irritation of the bowels; opium is therefore not required to be conjoined with it; it is consequently rapidly absorbed, and soon produces its peculiar action on the system. Whenever it is desirable to produce speedily the peculiar action of this medicine, as in most acute inflammatory diseases, where the process of disorganization goes on rapidly, we feel disposed from trial to say that this mode of administration will be followed by the speedy induction of ptyalism.

The author cautions against the indiscriminate employment of emetics to the exclusion of the mercurial or other more appropriate remedial means; and though he allows they may prove occasionally useful in those cases of amaurosis which are complicated with gastric derangement, he condemns them as highly injurious wherever there is a tendency to cerebral congestion or plethora.

Nothing regarding the employment of turpentine is stated on the author's own experience; but, from its success in subduing retinal inflammation in the hands of others, he thinks it deserves a fair trial in those cases where mercury is contraindicated, as in the strumous diathesis, old age, debility, &c.

In those forms of the disease arising from, or connected with, debility, tonics are recommended as highly useful; their choice to be regulated by the existing causes of debility; and of these iron, when not otherwise contraindicated, is preferred.

Counter-irritation forms a most important part in the treatment of amaurosis, and is applicable in every form of the disease, the main point being to keep up a discharge near the seat of the disease, and to persevere in its employment for the necessary length of time. It is remarked that the employment of counter-irritation on the temple possesses no advantage over that behind the ear or on the nape of the neck, and should never be unnecessarily employed in that situation. The endermic use of strychnine is recommended only for that form of amaurosis depending on atony of the retina, but is apt to do harm in all cases where there is congestive or inflammatory symptoms present. Particular directions are given as to the best mode of employing that remedy. A narrow blister is applied over the brow of the affected eye, and when the cuticle has risen properly, it is removed, and a quarter of a grain of strychnine sprinkled over the surface, the quantity being gradually increased till two grains are applied within the twenty-four hours. The surface is recommended to be only sprinkled once during the twenty-four hours, and savine cerate laid over it to avoid the necessity of renewing the application of a blister.

No opinion is expressed as to the value of electricity as a remedial agent; but the opinions of authors are quoted who are adverse to its employment. Nothing is stated regarding the employment of galvanism. These remedies, though much overlooked in this country, have been applied with considerable success to the treatment of amaurosis and other nervous affections on the continent; and the details of an interesting case, as well as the best means of using these remedies, will be found in another part of the present Volume.

Stimulant applications to the eye itself are mentioned as being proper when chronic conjunctival ophthalmia attends the amaurotic affection; but they are also applicable in all those cases in which electricity or strychnine would be considered as proper. Sternutatories are not recommended unless dryness of the Schneiderian membrane be present. Many other remedial means are enumerated, which greatly increase the probability of ultimate success, such as rest of the disordered organs, protection from a too powerful light, mild unirritating diet, tranquillity and composure of mind and body, gentle exercise in the open air, change of scene, and pure country air.

After detailing the modes in which the different forms of amaurosis have been classed by authors, Mr Hocken gives that which appears to him to be most free from objection, as being simple, yet correct and comprehensive, being founded on the anatomical classification. This has been already detailed when enumerating the chapters into which the work is divided.

Amaurosis from affections of the retina is the first great class which is described, and is treated of in six sections, 1. Inflammation, acute and chronic; 2. Organic changes the result of inflammation; 3. Pressure on the retina; 4. Injury from blows, wounds, &c. 5. Organic diseases, fungus hæmatodes, &c.; 6. Atony of the retina.

Acute inflammation of the retina is described as being a rare disease, only six or seven cases having occurred in the West of England Eye Infirmary during the last three years, out of nearly three thousand patients. The symptoms are described to consist of acute deep-seated pain in the globe, with an agonizing feeling of tension and pressure occurring in paroxysms, and aggravated towards night, the pain being liable from its severity to be mistaken for phrenitis. It is accompanied by almost intolerable pain over the brow, which occasionally darts through the brain. Intolerance of light, and sensations of flashes of fire, of a red or orange colour, attend the complaint; and the iris is frequently so contracted that the aperture of the pupil is invisible. At first there is little appearance of inflammation of the sclerotic coat, a slight zonular arrangement of pink-coloured vessels merely surrounding the cornea, becoming somewhat more distinct as the disease advances. The retina soon loses its sensibility, and the pupil dilates and becomes immovable. The pupil then presents a greenish tinge, and cataract also of a greenish hue is produced, constituting the disease called acute glaucoma. The disease terminates in different ways. In some cases complete disorganization occurs from the inflammation spreading to the other tissues, which give way and allow the humours to escape; or it may terminate in resolution in any of its various stages, leaving amaurosis more or less complete. High symptomatic fever attends this acute form of retinitis.

The causes of the disease are various, as anything which powerfully stimulates the retina may give rise to it, as well as injuries. The prognosis is stated to be always unfavourable; if the pupil be once closed, even before the retina appears to have become insensible, there is no longer any hope of preserving the sight.

The treatment recommended is of the most active antiphlogistic nature. Copious blood-letting from a vein, aided by the application of leeches or cupping-glasses; the rapid introduction of mercury into the system; or, should that be inadmissible, the free administration of turpentine internally in drachm doses, three times daily; an active purgative at the commencement of the disease, and laxatives afterwards; and counter-irritation not too near the seat of the disease. Three interesting cases of this form of disease are narrated at length.

Chronic inflammation of the retina is most commonly induced by straining the eyes in the examination of minute brilliantly illuminated objects. The symptoms described as occurring in this form are an intolerance of light or increased sensibility in the early stages of the disease, with a gradually contracting pupil, till the disorganization has gone so far that sight is destroyed, when it again dilates and becomes immovable. Flashes of light also attend this form, as also frontal headach, and pain over the brow. The eyeball itself is usually firm and tender. The progress of the disease is in general slow.

The general abstraction of blood is stated to be rarely required; but local depletion by leeches and cupping are recommended to be used in proportion to the severity of the symptoms and the powers of the patient. Mercury, however, is the remedy most to be trusted to, and is to be given so as to produce slight tenderness of the gums, which must be perseveringly continued until the disease subsides. Counter-irritation, by a succession of blisters behind the ear, or to the back of the neck, or a seton at the nape of the neck, or the eruption caused by tartar-emetic ointment, is the most valuable means of cure. The eyes should be carefully shaded, and absolute rest afforded them. Passive exercise in the country, and attention to the general health, form valuable adjuncts. Two illustrative cases of this form are given.

Four forms of complication are described, iritis with retinitis, iritis with amaurosis after fever, choroiditis, and ophthalmitis, which unites with the symptoms of retinitis that of the inflammatory affections of the other coats.

Little is stated regarding that form of amaurosis from the results of inflammation of the retina, as it is the necessary consequence of the organic changes produced by the inflammations above noticed.

Amaurosis from pressure on the retina is described as sometimes arising from the depression of a cataractous lens, from subchoroid dropsy, from dropsy of the vitreous humour, or from orbital tumours pressing on the globe of the eye. The subchoroid dropsy is exceedingly difficult to distinguish, and most frequently depends on acute or chronic inflammation of the choroid coat. If discovered, the aqueous fluid ought to be evacuated by puncture of the coats of the eye with a grooved needle. Dropsy of the vitreous humour may be recognized by the enlarged size and cubical shape of the eye produced by its coats bulging between the intervals of the recti muscles. The iris is pressed forwards against the internal surface of the cornea, but retains its natural colour; and the sclerotic coat is of a dark blue colour, from the vessels of the choroid being apparent through it. Vision is gradually lost. The general health must be improved, and efficient counter-irritation established for some time. If these means fail, the humours must be evacuated.

Amaurosis from injury of the retina is attributed to blows, injuries received in the depression of the lens in cataract, wounds, or simple pressure of the eye with the hand. This last cause might have been placed by the author under the last head. The loss of vision in such cases is sudden, the pupil is found dilated, and the iris motionless. The treatment is recommended to be strictly antiphlogistic, local blood-letting, cold applications, mercury if inflammation has been induced, purgatives, counter-irritation, electricity, or the endermic application of strychnine.

Amaurosis from organic disease of the retina is the result of various morbid growths, as *fungus hæmatodes*, or of melanosis, or of ossification of the retina and choroid coats. The symptoms of these diseases are merely described, the diseases themselves being beyond the power of art to cure.

Amaurosis from atony of the retina is by no means a rare disease, and occurs chiefly in delicate hysterical females, and in males of nervous temperament. Mr Hocken mentions that "individuals who are affected by weakness of vision are generally but ill protected from the influence of superior light, the superciliary ridges of the frontal bone are flat and undeveloped, the eyebrows deficient, and the eyes projecting." A flash of lightning or any other powerful brilliant stimulus may in a moment induce amaurosis. This form of disease, however, sometimes comes on slowly. Vision is first imperfect; weariness and aching are complained of in the eye; painful feelings are experienced in the eyebrow, and the vision becomes gradually more obscured till complete amaurosis results. The eyes appear natural at the commencement of the disease, but as it advances, and the retina becomes more insensible, the pupil dilates, and becomes less and less active in its movements; but the iris is of its natural colour, the humours are clear and diaphanous, and the eye retains its usual degree of solidity.

The principal indication of cure is to give tone to the system, and in particular to the nervous system. Mercury in alterative doses, regulation of the bowels by aperient medicines, with tonics, antispasmodics, or cordials, as may be required, rest for the eyes, and counter-irritation. Fomenting the eyes with some mild collyrium, or applying the vapour of ammonia or of ether to the surface of the conjunctiva, are mentioned as highly useful. "No form of amaurosis," it is stated, "is so likely to be benefited by the application of strychnia, or other things failing, by electricity or galvanism, as the atonic."

Amaurosis from affections of the optic nerves is the second great class into which Mr Hocken divides amaurotic affections. These he subdivides into four sections, according as they depend on inflammation, organic disease, pressure, or injury of these nerves.

Of optic neuritis too little is known to enable the symptoms attendant on it to be specified. The author merely states that inflammation of the nerve or of its neurilema, without doubt, occasionally occurs in severe cases of phlegmonous inflammation and suppuration of the orbital cellular membrane.

Amaurosis from injury of the optic nerves may arise either from direct injury of the nerve itself by a penetrating wound, or from the foreign body protruding and displacing the eye, and thus stretching the nerve, or pressing on it. Three illustrative instances of these forms are given, but the treatment is directed to be conducted on common surgical principles.

Amaurosis from organic changes and diseases of the optic nerve is by no means a common affection, and the symptoms attendant on it are so indistinct, that the cause of the amaurotic affection is rarely recognized till after death.

Amaurosis from pressure on and irritation of the optic nerve is generally produced by tumours, aneurism, induration, and hypertrophy of the orbital cellular substance, disease of the bones, &c. Several cases of these various forms are narrated; but no particular treatment is required on account of the amaurotic symptoms independent of the disease which gives rise to them.

Amaurosis from affections of the brain constitutes the author's third class. These are divided into five sections, according as the affection arises from inflammation, organic disease, sympathetic derangement, concussion, and injury, and disordered circulation, under which is included apoplexy.

In these cases the amaurosis is merely symptomatic of the more serious injury within the cranium, and requires no particular treatment other than what is needed for the removal of the cerebral disease. Numerous interesting cases are quoted from various authors, illustrative of these varied forms, for the details of which we must refer to the work itself.

Regarding that form dependent on sympathetic irritation, it is stated that the attacks of amaurosis are frequently sudden and of no long duration, and are sometimes periodical; circumstances which serve to distinguish this from other forms. By removing the disordered condition of the stomach and bowels, or of the uterine system, on which the irritation of the brain depended, the disease is removed.

Amaurosis from affections of the visual nervous system, brain, optic nerve, and retina, form the author's fourth class, and is divided into four sections, according as the affection is produced by debility, anæmia, hyperæmia, or the operation of poisonous agents.

When amaurotic symptoms arise in a debilitated or atonic state of the system, Mr Hocken attributes them to a deficient supply of arterial blood to the visual nervous system. This form is easily recognized, as it occurs merely as a symptom during the course of long protracted or debilitating diseases, after profuse evacuations and discharges, undue lactation, &c. The treatment required for the amaurotic affection is directed to be guided entirely by the nature of the case, the removal of the cause of the debilitated state, and the employment of tonics and stimulants. Counter-irritation, or the endermic application of strychnia, are also recommended as useful.

Mr Hocken points out that amaurosis may arise from anæmia or loss of blood, and gives a few cases in illustration thereof. He cautions against mistaking this form for its opposite, viz. that arising from congestion or from a plethoric state of the vessels, and quotes a case from Dr Gooch's work on the diseases of women, to show how closely the symptoms arising from exhaustion resemble those from inflammatory action.

Amaurosis from hyperæmia is described as being accompanied with severe headach, felt chiefly in the forehead and temples, vertigo, and *muscæ volitantes* increased on stooping, frequent noises in the ear, and a full, strong, and quick pulse. The amaurotic symptoms are gradually developed; the sclerotic and conjunctival vessels are more apparent than usual; the eyes are slightly protruded, and there is a sense of throbbing in them. The treatment recommended is strictly antiphlogistic when the amaurosis depends on general plethora; but in asthenic cases of congestion local blood-letting is alone admissible, and sometimes even this is injurious.

Cases are recorded of amaurosis being produced by belladonna, hyoscyamus, tobacco, opium, stramonium, and other poisonous agents. The amaurosis, being merely a symptom of the general affection of the system, disappears as these are removed.

Amaurosis from affections of the *nervus trigeminus* forms Mr Hocken's fifth class, and these he divides into two sections, according as the disease is seated within or without the cranium. This is an important class, as showing the connection of the fifth pair of nerves with the sense of vision. Magendie was the first to show that injury or disease within the cranium was followed by amaurosis, destructive ulceration of the coats, and at length evacuation of the humours of the eye. On division of the nerve within the cranium, the same symptoms resulted, together with loss of sensation of the whole of that side of the face, and of the eye. The same symptoms have been remarked by others to result from tumours compressing the origin of the fifth pair of nerves, or disease of the same parts. Mr Hocken does not appear to be satisfied that division of this nerve destroys the sense of vision, and he refers to Dr Alcock in support of his opinions. A very curious case, however, will be found related in the present volume of this Journal, where the whole branches of fifth pair of one side were affected, apparently from exposure to cold, and where the sense of vision of the corresponding eye was so completely lost that the person could, with great difficulty, distinguish between light and darkness, the sensibility of the eye and of its tunics being at the same time destroyed.

Wounds or injuries of the branches of the fifth pair, particularly of the supra-orbitar or frontal branch, have been long known to produce amaurosis, and the author quotes several of these. Most writers regard this circumstance as a proof of the sympathy which exists between the supra-orbitar and ophthalmic branches of the fifth pair with the optic nerve. A late author, however, Dr Fr. de Walther, in a paper published in the Journal der Chirurgie for 1840, denies that injury of this nerve has anything to do with the production of the amaurotic affection, but attributes it to the direct violence sustained by the organs within the orbit by the concussion of the blow, or to the injury done to the brain. He, however, admits that amaurosis may be induced by inflammatory action being propagated from the supra-orbitar wound to the retina or optic nerve through the continuity of the tissues. The cases which are on record of the amaurosis being immediately removed by division of the supra-orbitar branch proves sufficiently that some close connection does exist.

Mr Hocken gives no directions as to the treatment of any of these affections of the fifth pair. He merely relates a case where dividing the frontal nerve, which was involved in a cicatrix, served to restore vision. It is, however, more than probable, that many of these cases might be benefited by galvanism or electricity, provided no organic changes resulted from the injury.

Congenital amaurosis, which forms the author's sixth class, is attributed to some defect of organization, or arrest of development of the visual nervous structures, and is consequently irremediable.

Amaurotic and nervous affections constitute the seventh and last class, and include no fewer than eleven different maladies. These are, 1. Glaucoma; 2. Hemeralopia; 3. Nyctalopia; 4. Amaurotic cat's eye; 5. Myopia; 6. Presbyopia; 7. Inability to distinguish certain colours; 8. Hemiopia; 9. Ocular spectra; 10. Strabismus and Luscitas; 11. Diplopia and Monoblepsis.

Although some of these are connected with nervous affections, and give rise to a certain degree of dimness of vision, and may be hence properly enough placed under amaurotic affections, yet others are included which have certainly nothing in common with that complaint, such are myopia, presbyopia, and inability to distinguish certain colours. In all these cases, the retina remains as sensitive as ever, and in the two first, when the faulty form of the lens or eye is corrected by means of crystal lenses, the sense of vision is restored as distinct as before The inability to distinguish colours does not interfere in the least with the sense of vision, the most minute as well as the most distant objects being still seen with equal clearness. It is exceedingly difficult to refer this peculiarity to its cause; but Sir John Herschel's opinion, founded on experiments made on eyes affected with this peculiarity, is probably the correct one, viz. that it is owing to " a defect in the sensorium, by which it is rendered incapable of appreciating exactly those differences between rays on which their colour depends."

It may be mentioned that M. Jules Guerin has lately discovered that myopia sometimes depends on a morbid contraction or rigidity of the recti muscles, which, by their pressure, alter the form of the eyeball. Strabismus occasionally attended this form of the complaint. In these cases he succeeded in removing the affection by dividing the recti muscles in the same manner as is now commonly done for the cure of strabismus.

Glaucoma, characterized by the deep-seated green appearance of the humours, gradual failure of the functions of the retina, and, after the disease has continued for some time, by the production of a greenish-coloured cataract, is pretty fully detailed, together with its appropriate treatment. It is remarked that glaucoma appears most frequently in individuals who are past the middle period of life, who are of full habits, and accustomed to free living, and also in those who are subject to arthritic complaints. The proximate cause is referred to inflammation of the hyaloid membrane, and of the internal tunics of the eye; but senile glaucoma is stated to depend probably on a condition of vessels similar to that which leads to enlargement of the prostate gland, or to the formation of the opaque circle around the cornea. The treatment prescribed consists of blood-letting, purging, the administration of mercury, counter-irritation, rest, and regulated diet.

Hemeralopia, or night blindness, is attributed to exhaustion of the powers of the retina by exposure to strong light during the day. Its occasional connection with disordered bowels, paralytic affections, scurvy, &c. are also mentioned. For the cure of this affection, Mr Hocken recommends attention to the state of the bowels, shading the eyes from excessive light, counter-irritation, and the endermic application of strychnia. Since Mr Hocken's treatise was published, Mr W. L. Wharton, of the United States Army Medical Staff, has published the history of a number of cases of hemeralopia, where the cure was effected in the space of from thirty-six to forty-eight hours, even though in some the affection had lasted for three months, by simply confining the person for that space of time in a completely darkened apartment. For an abstract of these cases, we beg to refer to the 54th volume of this Journal, p. 516.

Nyctalopia, or day blindness, as a distinct affection of the retina, is stated to be extremely rare, but very common as a symptom of other affections, as in central opacity of the cornea, where the vision is restored in the dusk of the evening by the increased dilatation of the pupil. The albino's eye is stated to be an example of day blindness, as also, the intolerance of light so frequently observed in strumous children.

Amaurotic cat's eye is stated to be an extremely rare affection. It consists of a peculiar pale-gray or yellowish-red metallic appearance, seen at the fundus of the eye in a certain direction, in a feeble light, similar to the glare of the cat's eye when seen in the dark. The sight is confused, and gradually becomes extinguished as the disease proceeds; at the same time, the bottom of the eye becomes more distinct, the colour of the iris paler, and a fine vascular net-work becomes apparent, probably the ramifications of the *arteria* and *vena centralis retinæ.* It is stated that, as the cause is unknown, little or nothing is to be expected from any treatment.

Hemiopia, or partial blindness, is considered as not an uncommon symptom in some forms of amaurosis. The causes of this complaint have been referred to organic disease, or deranged circulation within the cranium, or to disturbance of the digestive organs. The author directs the treatment to consist in the removal of local congestion, and attention to the state of the digestive organs. In those cases which have come under our notice, the affection depended on disturbance of the digestive organs alone, and the appropriate treatment soon dispelled the malady.

Ocular spectra, as *muscæ volitantes*, and photopsia, or flashes of fire, appear generally as symptoms of organic lesions, or of diseases of the eye, but, when unaccompanied by these, are quite harmless, and may be removed by any of the means which improve the general health, and remove the cause of the irritation of the eye.

It is unnecessary to enter farther into what the author states regarding the other affections which he places under this class. The subject of strabismus, instead of a few pages, would require a considerable space to treat it as it deserves. Dr Jules Guerin read before the Royal Academy of Sciences of Paris, a long and interesting paper on the subject in January last; but our space does not permit us to enter into its details at present.

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## ART. III.—*The Anatomy of the Nerves of the Uterus.* By ROBERT LEE, M.D., F.R.S., Physician to the British Lying-in Hospital, and Lecturer on Midwifery at St George's Hospital. With two Plates. Folio, pp. 8. London, Paris, Leipzig, 1841.

THOUGH the nerves of the womb have been described at various periods of the history of anatomy, it was long before they were described, demonstrated, and represented with that degree of accuracy which was calculated to be useful to physiological purposes. Many of the descriptions of the early anatomists were, indeed, vague and general, and seem to have been written rather in the idea that the womb, like other sensible and irritable organs, ought to have nerves, than because nerves were actually demonstrated to be distributed in its substance. For the discordance of these descriptions, indeed, it is difficult to account in any other mode than this.

The uterus is peculiarly situate in this respect, that it is liable to two different states,—the unimpregnated and the impregnated, and also that its condition, in the period before puberty and in old age, is very different from its state in the period of puberty, and in that which may be termed the puerperal period of female life. Previous to puberty and in old age the uterus is small, and its organization is much less distinct than in the puerperal period. It is natural to think, that, in the immature or impuberal time of life, the nerves of the womb may be small and indistinct. It is natural also to think, that these nerves, if they exist, become larger and more distinct in the mature than in the impuberal state; and that, if the womb be not excited by the function which it is intended to accomplish, these nerves may either remain stationary, or they shrink and become small, until old age advances, when they return, it may be inferred, to a state analogous to that which is observed previous to the period of puberty.

It seems uncertain whether any person has examined the womb in females previous to puberty, with the view of ascertaining the existence and condition of its nervous system. The state of that system in the virgin uterus of the mature female has been first carefully examined and described by Dr Lee. In the body of a young woman who had never been pregnant, and in whom the uterus was of the ordinary size, Dr Lee found the spermatic nerves on both sides chiefly derived from the renal plexus, the most of these nerves distributed not upon the spermatic arteries but on the veins, some branches going to the Fallopian tubes and ovaries, and others passing to the uterus into the great transverse plexuses beneath the peritoneum, on the posterior or dorsal or sacral surface of the uterus.

"The aortic plexus, hypogastric nerves, and plexuses are considerably larger than in the last dissection. [This was in the unimpregnated uterus of a female beyond the middle period of life.] The arteries of these nerves and plexuses have been successfully injected, and it is evident that they are much smaller, than the arteries in the gravid uterus at the fourth month. The ganglia are large and distinct, and the branches sent off to the bladder, vagina, and rectum are all accompanied by arteries filled with injection. Numerous branches of nerves are seen accompanying the uterine blood-vessels to the fundus, and the plexuses on the body of the uterus, before and behind, are continuous with the branches proceeding from the hypogastric plexuses, and the ganglia at the cervix."—P.8.

From the appearances found in another instance, in which Dr Lee dissected and exposed the nerves of the unimpregnated uterus, in the body of a woman beyond the middle period of life, it results that the aortic plexus, the hypogastric nerves, and plexuses were much smaller than in any of the gravid uteri examined by Dr Lee. There seems, therefore, to be little doubt that the orgasm of pregnancy has the effect of enlarging not only the blood-vessels, but the nerves of the womb. In this case the description of the nerves is the following.

"From the fore and middle part of the left hypogastric plexus, a small branch passed down on the inside of the ureter to the trunk of the uterine artery and vein, which were surrounded with a plexus of nerves as in the gravid uteri before examined. From this branches passed upward to the fundus uteri, and a communication between these and the spermatic nerves was quite evident. From the left hypogastric plexus numerous branches also passed directly into the uterus without entering the ganglion at the cervix, which ramified under the peritoneum behind, and on the muscular coat. Branches from the posterior part of the hypogastric plexus communicated with some branches of the sacral nerves behind the ganglion. The trunk of the left hypogastric nerve was easily traced through the plexus to the upper part of the ganglion, which was remarkably large and distinct, and consisted of white and grey matter. Into the posterior part of the ganglion, the third sacral nerve sent numerous small branches. From the anterior margin of the ganglion, a broad band of white and grey nerves passed round the outer surface of the ureter, and after uniting with a similar band on the inside, sent branches to the plexus surrounding the uterine artery and vein, and also branches to the anterior surface of the uterus. Large flat nerves were seen passing off from the anterior border of the ganglion to the bladder and vagina, and from its inferior and posterior borders to the vagina and rectum. A great number of nerves likewise passed off from the inner surface of the ganglion into the cervix uteri. The nerves sent off from the ganglion were both larger and more numerous than those which entered it. A great web of nerves was seen under the peritoneum, both on the anterior and posterior surface of the uterus, intimately connected with the nerves sent off by the ganglion and the hypogastric plexus."—P. 7, 8.

We must turn now to the state of the nerves during pregnancy; and it appears from the dissections of Dr Lee, that in this state the nervous plexuses and branches become large and distinct, so as to seem much more numerous than in the unimpregnated organ.

First, in the third month, and it may be added the fourth, the utero-cervical ganglion is large, thick, and distinct, of an oblong shape, about three-quarters of an inch in diameter, and consisting of white and gray matter. Into this ganglion pass the hypogastric and sacral nerves, at this time smaller than in the ninth month; and from its lower margin issue three bundles or masses of nervous fibres, which present an appearance like the *pes anserinus* of the *portio dura* or the seventh or facial nerve. This is perhaps a little less distinct in the third than in the fourth month. The posterior of these is subdivided into numerous small branches, which, accompanied with arteries, supply the rectum and the back wall of the vagina. The branches of the middle bundle likewise accompanied with arteries, are ramified on the side of the vagina. The anterior branches are ramified upon the bladder and the entrance of the ureter.

From the hypogastric plexus, before it enters the ganglion, and from the inner surface of the ganglion, are sent to the neck of the womb numerous large and small branches of nerves, some of which accompany the blood-vessels to the fundus, and others are spread out beneath the peritoneum. From the inner border of the ganglion issue two nervous bands, one broad, passing on the outside of the ureter, another on the inside, when they unite and surround the ureter. From these united bands many considerable branches are sent to the back part of the bladder, and into the anterior part of the *cervix uteri.*

On the lower and anterior part of the cervix, over the mesial line, is a thick membranous expansion, into which these nerves are received from both the hypogastric plexuses and the ganglia. From the sides and upper part of this membrane are sent numerous filaments, apparently nervous, which are afterwards lost in the round ligaments.

The state of the nervous system of the womb is described at the sixth month of pregnancy, in the seventh month, and in the ninth month; and it appears that the arrangement now mentioned is the most usual; and that the principal change effected consists in the circumstance, that the nervous branches become larger and more distinct as pregnancy advances. Thus it appears that there is an utero-cervical ganglion on each side of the *cervix uteri;* that from this branches are sent to the bladder, rectum, and vagina; that from the hypogastric plexus and utero-cervical ganglion conjointly, branches sink into the *cervix uteri* (Fig. 2. 6.), and are also made to unite with those of the opposite side, beneath the peritoneum; that in the latter periods of pregnancy, viz. the ninth month, similar unions are observed over the posterior surface of the body of the uterus; and that the whole of these nerves become larger at this period than previously.

The conclusions which the author deduces from the whole of these dissections, may be understood from the following extract:

" These dissections prove that the human unimpregnated uterus possesses a great system of nerves, which enlarges with the coats, blood-vessels, and absorbents during pregnancy, and which returns after parturition to its original condition before conception took place. It is chiefly by the influence of these nerves, that the uterus performs the varied functions of menstruation, conception, and parturition, and it is solely by their means, that the whole fabric of the nervous system sympathises with the different morbid affections of the uterus. If these nerves of the uterus could not be demonstrated to exist, its physiology and pathology would be completely inexplicable."—P. 8.

These views are ingenious, and seem well founded. But they do not throw so much light on the sympathies and actions of the womb, as might have been expected from an exposition of the nervous system of the womb so elaborate and complete. We believe that Dr Lee wished to confine the present publication to the mere description of anatomical facts; and that he felt, that to go more into detail than is done in the preceding sentence, might have been entering on a subject which is at once uncertain, and upon which, without a full discussion of its multiplied questions, it would have been idle to enter at all.

At the same time it may not be improper to notice shortly one or two points connected with the anatomico-pathological relations of this subject.

It may be inferred that the presence, the formation, and the connections of the utero-cervical ganglions afford a satisfactory explanation of many of the morbid sensations, and uneasy feelings of which females labouring under uterine disorder, and utero-vaginal disorder, complain. Thus, the gnawing pain in the back, and in the lumbo-sacral region, so frequent in females labouring under disordered menstruation, suppressed menstruation, painful menstruation, and utero-vaginal catarrh or leucorrhœa, is doubtless dependent on the turgid and vascular state of the *os* and *cervix uteri* acting upon the ganglions and their branches, and reflected backwards to the spinal connections of the nerves from which the utero-cervical ganglion is formed.

Many of the uneasy and very excruciating sensations and symptoms at present classed under the comprehensive and convenient abstraction of spinal irritation, are evidently to be referred not so much to irritation primarily seated in the spinal chord, as to irritation, which, if seated there, derives its first origin from causes which act on the uterus, and on its nervous system. By far the greatest proportion of sufferers from the disorder are females; in almost the whole, if not the whole, the uterine circulation and the uterine functions are in various modes and degrees disordered. In one, there is chronic inflammation of the orifice and neck of the uterus, with leucorrhœa. In another, there is amenorrhœa, with an inflammatory state of the inner membrane of the womb. In a third, there is amenorrhœa with an anæmial condition of the womb, or a flaccid, but enlarged, tumid and softened state of the neck and orifice of the organ. In a fourth, there is dysmenorrhœa, with excessive pain in the uterus, vagina, and adjoining parts, at each menstrual period. In no case of this kind, in short, is the uterus or its circulation, quite healthy. These morbid states cannot take place without causing more or less irritation in the uterine extremities of the nervous system of the womb; and they may, as in other cases, take place, and cause the irritation, without, however, giving indications of the existence or degree of that irritation, at the precise and original locality where it is greatest. But the morbid state of the uterine nerves is reflected backwards to their spinal connection, and there, probably, by the orgasm being propagated to their sensitive roots, gives rise to the peculiar acute, or the gnawing and uneasy pain in the back, or, in short, the excruciating suffering, of which females with deranged uterine action so often complain.

Finally, from the extensive and intimate connections which exist between the utero-cervical ganglion, and the nerves which contribute to form it, on the one hand, and the nerves of the splanchnic system on the other, with which these are associated, we can understand the occurrence of gastric symptoms, as acidity, *pica*, heartburn, flatulence, gastrodynia, especially the severe pains often felt in the site of the stomach; the intestinal pains, and other morbid phenomena felt in the course of the bowels; the pains in the splenic region; those in the region of the heart, together with the abnormal and often violent action of that organ; the palpitation; the blowing sounds in its contractions; and the rapid motion which it often presents; the pains in the mammæ; and, in short, many of those neuralgic and painful sensations felt in organs very remote from that which is the seat of the evil.

A therapeutic practical inference deducible from these considerations, is, that in many of the painful diseases of females, careful inquiry into the state of the womb and its secretions, and its appendages, ought to be made, and that in either giving a prognosis, or concerting therapeutic measures, attention should be paid to the state of the womb; and those remedies ought to be exhibited which are most likely to restore that organ to its healthy state, in order to relieve or assuage the other symptoms.

This work is illustrated by two good lithographic delineations of the nerves of the gravid uterus. In the explanation of the first figure in Plate first, there is some mistake, as there is no explanation to the cypher figure 12.

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Art. IV.—*Abhandlung über Perkussion und Auskultation.* Von Joseph Skoda, D. der Medicin, Mitglied der Medicinischen Fakultät und der k.k. Gesellschaft der Arzte in Wien. Wien, 1839. 8vo, pp. 271. *Treatise on Percussion and Auscultation.* By Joseph Skoda, M. D., Member of the Medical Faculty and of the Royal-Imperial Society of Physicians in Vienna. Vienna, 1839.

Since the year 1819, when Laennec first published his views on the diagnosis of the diseases of the lungs and heart, by means of auscultation and percussion, that method of observing the nature, progress, and extent of diseases of the chest has engrossed the attention of a great many physicians, both in hospital and private practice. It was not to be expected that a method of diagnosis, so new and dependent often for its accuracy upon circumstances peculiar to individual observers, was to be all at once, or by one person, carried to complete perfection. The explanations accordingly given by Laennec of several of his signs, and of their indications, have not been received by all subsequent observers with the same degree of unanimity; and several auscultators have not only doubted the accuracy of several of the stethoscopic signs specified by him, but they have themselves given new explanations of some of the sounds afforded by the lungs and heart, and, in other instances, they have modified several of the signs mentioned by Laennec.

These circumstances,—the natural progress of science and the wish to diffuse the knowledge of a very important branch of diagnosis,—have given rise to the publication of a great number of works devoted either to auscultation and percussion, and the best methods of studying them, or to the history of the diseases of the lungs and heart, and their diagnosis by means of auscultation and percussion. Hence, in addition to a considerable number of manuals and guides on the subject, we have had not only four editions of the work of Laennec, with four editions of the translation, but works of different degrees of merit from Dr Forbes, Dr Williams, the late Dr Davies, Dr Latham, Dr Hope, and Dr Stokes in this country; and abroad by Andral, Piorry, Louis, Chomel, and Bouillaud; besides numerous essays and observations in different journals by many authors.

Of all the works, however, which have been published on this subject since the time of Laennec, no one is more remarkable for the originality of the views of the author, for the amount of accurate and precise information, and for the numerous and extensive rectifications made by him, than the work of Dr Skoda of Vienna. Dr Skoda has the merit of being almost a self-taught observer, so far as auscultation goes. Trained in the usual career of medical education, his attention was not directed to any particular department of medicine, nor had he the benefit of either example or instruction in the use of the stethoscope. Auscultation, indeed, was not only underrated in the clinical department of the hospital before his time, but it was even despised, and consequently unknown. Dr Skoda had full access to the great general hospital, had ample means of studying the symptoms of diseases of the heart and lungs by means of auscultation, and he did so rather by observing for himself than by adopting the distinctions laid down by his predecessors and contemporaries. The result of this is, that his observations are remarkable for their originality; and, as he has been less fettered by the systems of his predecessors and contemporaries, he has succeeded in giving of the phenomena of auscultation and percussion views not less remarkable for their novelty than accuracy.

In consequence of being obliged to study the phenomena and indications of auscultation and percussion in the manner now mentioned, when Dr Skoda came to compare the results obtained and the conclusions drawn by himself, with those given by other authors, he found not only great discordance, but difficulty amounting to impossibility of assenting to many of the views given by other authors. He was led consequently to revise, and rectify, and compare his views more accurately; and especially in the course of giving clinical instructions, to explain these views more at large, and adduce the facts on which they rested. In this manner he found it necessary to embody the whole of his views in a separate treatise; and of this labour the present volume is the result.

The volume consists of two general divisions. The first is devoted to the description and explanation of the phenomena which are observed by means of percussion and auscultation. In the second division, the author takes a view of the particular morbid conditions of the organs of the chest and abdomen, and the phenomena furnished by them, which are ascertained by percussion and auscultation.

The first part is subdivided into two sections; one on the subject of percussion, and the other on that of auscultation.

The first section consists of two chapters; one on the sounds elicited by percussion, and their varieties and their conditions; the full and empty sound; the clear and dull sound; the tympanitic and the untympanitic sound; the high and the deep sound; the metallic ringing sound; the moist or humoral sound of Piorry; the sound of the cracked pot, and the hydatid tone of Piorry.

In a second chapter he devotes some observations to the examination of sensible impediments to percussion.

The second section on auscultation is much more extensive; and the author here enters into an elaborate view of the various phenomena and symptoms afforded by auscultation, and the best mode of observing them. The section consists of two chapters; the first devoted to the auscultatory phenomena furnished by the organs of respiration; the second to those furnished by the organs of circulation.

Of a considerable portion of this division of the work an abstract has been given in another part of the present Number, (p. 88); and another abstract shall be given in our next, so that it is unnecessary here to enter into any detail. It is enough to say, that Dr Skoda considers very minutely and carefully the varieties of sounds furnished by the voice transmitted through the chest in the healthy condition and the different states of disease.

The second part is also divided into two sections; the first devoted to the normal or healthy state of the thoracic and abdominal organs, and the phenomena which in this state they furnish upon percussion and auscultation; and the second to the abnormal or unhealthy state of these organs, and the phenomena which in that state they furnish upon percussion and auscultation.

After first distinguishing the latter into three general heads, viz. unnatural positions of the thoracic and abdominal organs, irregularities in the structure of the bony part of the chest, and morbid conditions in the organs of the chest and belly, he directs the great force of his attention to the examination of the latter subject, which is ample, elaborate, and satisfactory.

The auscultatory and percussion symptoms of the different diseases of the lungs he enumerates and describes in the following order: 1. Diseases of the bronchia; 2. Diseases of the pulmonic parenchyma, viz. pneumonia, gangrene, pulmonary apoplexy, œdema of the lungs, emphysema, hypertrophy, atrophy, and tubercles, in different forms and stages; 3. Diseases of the pleura, viz. pleurisy, hydrothorax, pneumothorax, tubercles, encephaloma, &c. The auscultatory and percussion symptoms of the heart are enumerated and described under the heads of morbid states of the pericardium, morbid states of the substance of the heart, morbid states of the endocardium, and morbid states of the aorta and pulmonary artery.

In the present short notice, we have already virtually expressed the opinion, that the treatise of Dr Skoda is entitled to the first rank among those devoted to the subject of auscultation and percussion. We adverted in previous numbers to the merits and characters of most of the treatises on this subject at the time of their appearance; and only in our last number we had occasion to introduce to our readers a very excellent manual by Messrs Barth and Roger. We should have previously, perhaps, spoken of the small but useful Manual of Dr M. A. Raciborski,—a performance in which the author showed much knowledge of the labours of his predecessors and contemporaries, and intimate acquaintance with the most arduous and obscure, and controverted points of the subject.* It must not be ascribed to any desire to depreciate the services of these meritorious labourers, if we still assign the palm of superior merit to the Treatise of Dr Skoda. All these treatises and manuals are excellent in their way; all have been serviceable, and will continue to be serviceable, in communicating and diffusing the knowledge of the art of observing by means of auscultation and percussion the phænomena of diseases. The present work, however, possesses peculiar merit in containing, not only more original views than most others on the same subject, and in rendering the information precise and accurate, but also in a more thorough application of the laws of physics and acoustics, and consequently a greater degree of scientific consistence than is observed in other treatises.

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* New and Complete Manual of Auscultation and Percussion, applied to the diagnosis of Diseases. By M. A. Raciborski, M. D., &c. Translated by William Fitzherbert, B. A. Cambridge. London, 1835.

It is desirable that a work possessing so many recommendations should no longer be confined to the original. A good English translation, we have every reason to believe, would be well received and very generally studied.

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## Art. V.—*The Anatomy of the Arteries of the Human Body, with its applications to Pathology and Operative Surgery. In Lithographic Drawings, with Practical Commentaries.* By Richard Quain, Professor of Anatomy in University College, and Surgeon to University College Hospital. The Delineations by Joseph Maclise, Esq. Surgeon. Part I, II, III, IV, 1840; V, VI, and VII, 1841. London. Imperial Folio.

The correct anatomical knowledge of the origin, position, course, and distribution of the arteries of the human body is a matter of such indispensable necessity, and the necessity of this knowledge is of such daily recurrence, that it is impossible to render the study of that branch of anatomy too minute, or to diffuse a taste for it too widely. Every surgeon feels in the course of the daily exercise of his profession, that difficulties take place which often make him admit, either that his knowledge is deficient, in not embracing all the possible deviations which may occur, or in not distinguishing between that which is constant and that which is only general, and sometimes in ascertaining what is regular and what is irregular. This is particularly true of what is termed the Surgical Anatomy of the Arterial System,—a branch of knowledge which has been created only during the last thirty years; and which is daily acquiring a higher degree of interest and importance, in proportion as the question, not only of the practicability of operations involving the arteries is concerned, but also that relating to the most eligible and expedient points for the application of ligatures comes under consideration.

Haller, that name which is consecrated by the remembrance of so many services to anatomy and physiology, was the first who, in his *Icones Anatomicæ*, gave good delineations of the origin, course, and distribution of the arteries; and for more than eighty years his work continued the great authority in every point relative to the anatomical history of this system. This work, however, labours under two deficiencies, which are acquiring greater magnitude as the necessity of the knowledge of the surgical anatomy of the arteries becomes more obvious and urgent. *First*, most of the views of Haller were given from the blood-vessels and bodies of young subjects; and *secondly*, too little regard is paid to the relative points in the course of arteries; and, in short, to those facts which are necessary to the knowledge of their surgical anatomy. Scarpa, indeed, attempted to supply many of these defects and omissions, and did it very ably; and the late Sir Astley Cooper contributed most essentially by his labours to supply others.

A complete and systematic view, however, of the anatomical relations of the arterial system was still wanting when the large and valuable work of Tiedemann appeared in 1822. The numerous views of varieties in origin, course, and distribution, presented by that work, threw new light on the subject, and, by showing how much accurate information had been required, invested it with greater interest, and inspired others with the desire of studying it more extensively and more accurately. The work of Tiedemann is, indeed, in no respect so useful as in showing that, without more extended observation and more careful study, it would be quite impossible to say when all the varieties in the arterial system might be allowed to be fully ascertained and perfectly made known.

The present publication affords clear evidence of the justice of these views. The author has been for several years engaged, in the course of superintending a large anatomical establishment in London, in observing all the varieties presented by the trunks and large branches of the arterial system; and as his observations, in a field so extensive, gradually accumulated, he was at length in a condition to draw conclusions both as to those facts which might be regarded from their number as constant, and consequently might be deemed capable of establishing some standard as to origin, course, size, and distribution, and also as to that less multiplied class of cases which might be viewed as deviations from the standard, exceptions to the rule, irregularities, and anomalies, and in some measure to estimate the comparative frequency or rarity of each order.

The present work is therefore manifestly the result of great labour and care. The seven numbers before us contain about the half of the proposed work, that is 35 plates among 65; and in these 65 plates will be given views of all the most usual conditions of each of the large arteries in the human body as they were observed in about 290 subjects.

The work is also accompanied with descriptive letter-press in 8vo. In these explanatory pages the author not only describes the usual origin, course, and relations of the large arterial trunks and branches, but he gives tabular views of the measurements made to determine the exact point of origin in a considerable number of cases, with a view to surgical operation, and also a number of practical inferences on the most proper parts for performing operations or applying ligatures.

The seven numbers already published embrace the arch of the aorta and the branches which issue from it, with all the variations, This child communicated the disease to the breast of the mother, and it appeared entirely confined to the sebaceous glands around the nipple of that breast, which the child continued to suck.

The tumours on the breast are of various sizes, from that of a pea to a hazelnut, three of the larger ones being clustered together, all exude a thick whitish matter when pressed between the fingers, and they seem to be equally insensible to the touch as those on the child. They first appeared on the breast about a month and a half after those on the face of the child.

The largest of these tumours latterly became inflamed and extremely troublesome, from the irritation of the rubbing of the clothes against them.

Particular inquiry was made as to any other members of the family being affected with a similar eruption; but no trace of it could be discovered, and an attempt to find out the source of contagion to the child proved equally unsuccessful; indeed, from the inquiries made, had any similar case existed in the village, it must have been discovered. This series of cases was seen by my friends, Professor Simpson, Dr W. Thomson, Dr Mercer, and Dr Lund, all of whom looked upon them as very characteristic of the disease in question.

*Treatment.*—Mrs C., the mother, was anxious that something should be done for the tumours, as they afforded her considerable inconvenience from rubbing against her dress, and, at the suggestion of Professor Simpson, the tops of them were touched with caustic potass. The application afforded little uneasiness to the patient; the escharotic destroyed a portion of the tumours, and the remainder soon sloughed off by their bases, leaving a healthy granulating surface, which healed kindly, and no return of them took place.

As the child's health was not in the slightest affected, no treatment whatever was had recourse to. The tumours as they enlarged generally suppurated, scabbed, and then fell off by their base, and as this happened to more of them than was generated, a decided diminution soon took place, and at the present time there are only a very few remaining.

CASE II. presented itself at the Leith Dispensary for consultation on the 2d of April last. The child, Ann M'Queen, 2 years old, strong and healthy, has been affected with the disease for the last two months. The mother ascribes it to her having been carried about by a girl who had some "similar lumps" upon her body, while they resided at Dundee, and immediately before they came to Leith. The eruption at present occupies the left side of the neck and shoulder, and a few are scattered here and there upon the same side of the face and trunk of the body. The disease resembles very much in appearance the case last described. The small tumours have the same pearly appearance, and the larger ones, being slightly redder than the skin, and exuding a milky fluid from the orifice at their apex. The tubercles at present appear in groups, and irregularly scattered over the surface of the skin; their number may be from thirty to forty on the present patient. The mother states that the girl, who was primarily affected at Dundee, used to carry this child chiefly against that side of her neck. But neither the mother nor any other of the children in the family have any appearance whatever of the eruption. This, however, may be partly accounted for by the fact, that the dress of this child being tied up round the neck, prevents, in a great measure, at least, any immediate contact between the eruption and the skin of the other children. Several of the largest of these tumours were cut off with a pair of scissors, and the skin healed well afterwards; others were destroyed with the caustic potass and nitrate of silver, but still the number of them on the body of the patient is not much diminished.

The next case which presented itself was that of a young married man, whose wife I had attended in labour some weeks previous. It was observed during the progress of the labour, that numerous small tumours existed at the orifice of the vagina, and in the neighbourhood of the vulva, but, thinking that they might be condylomata, or warts, no further attention was paid to them. The husband, however, shortly after showed me a number of tumours on the penis, which bore the characteristic marks of *molluscum contagiosum.* Upon inquiry regarding similar tumours on his wife, he informed me that they were of the same kind as those on his penis. They occasioned him considerable annoyance, and he applied for the purpose of getting them removed. The larger ones were cut off with the scissors, and the smaller touched with nitrate of silver, and they have all entirely disappeared.

Since the above cases occurred, I have had an opportunity of witnessing a beautiful and well-marked case of this rare disease, occurring in a child under Dr Henderson's care in the Royal Infirmary.

This disease is as yet to be regarded as entirely British,—the latest authors in France, Germany, and America, making no mention whatever of it in their respective countries. We find Rayer, indeed, who wrote in 1827, and who is for referring the molluscum of Bateman to disease of the sebaceous follicles, saying, "etaient ils autre chose que des tumeurs folliculeuses? est-il bien démontré que cette affection soit réellement contagieuse?" It would appear from the cases which we have quoted, and from those which we have ourselves observed, that the disease has now been seen sufficiently often to enable us to answer M. Rayer's question in the affirmative. Dr Craigie, many years ago, saw reason to infer, from a case of the chronic molluscum which he communicated to the London Medico-Chirurgical Society, that this disease arises from "some morbid or vitiated state of the sebaceous follicles;" * and we have strong grounds for referring the contagious species with M. Rayer to disease of the sebaceous glands. The drawing of enlarged sebaceous follicles in M. Rayer's work on Diseases of the Skin is sufficient to show this, and resembles very much, indeed, the species of molluscum at present under consideration. Besides this fact, however, the position of *molluscum contagiosum* is principally that where the sebaceous glands are most numerous, as at the angles of the nose, mouth, and eyes; and in several attempts which we have made to inoculate the white matter of molluscum into healthy skin, they have all

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* Craigie's Pathological Anatomy, p. 643.

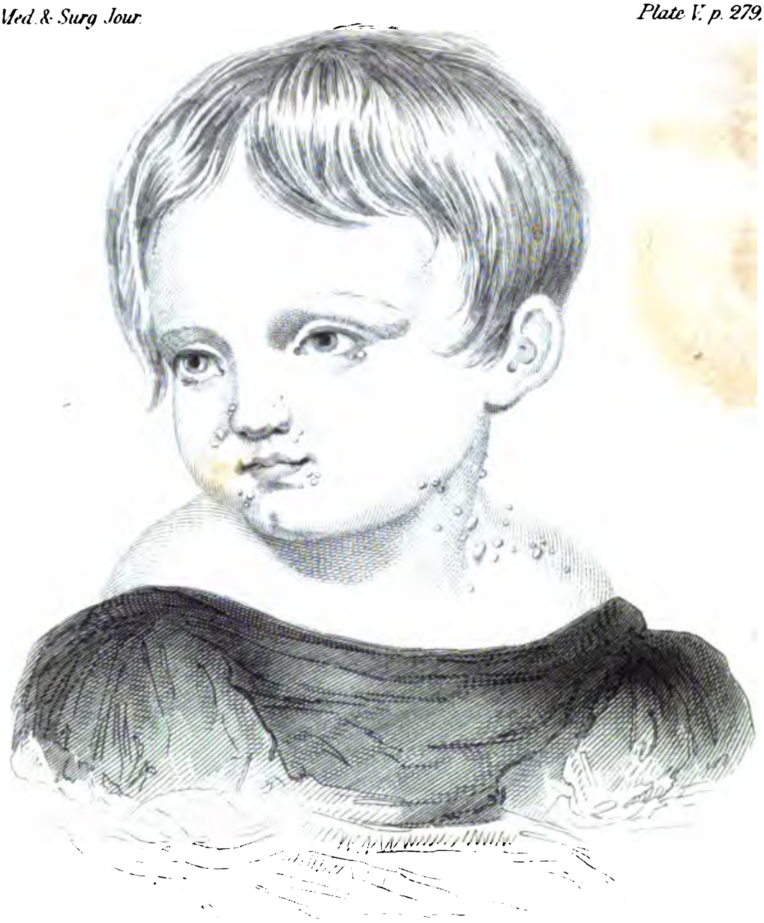


Fig. 1.

Fig. 3.

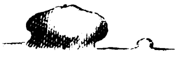
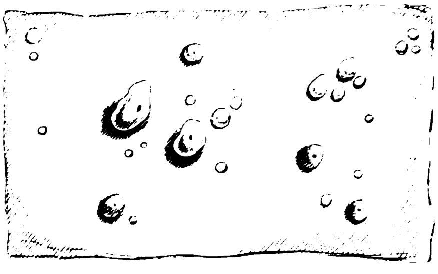


Fig. 2.



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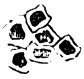

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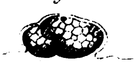

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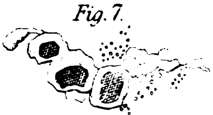

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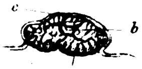


Fig. 10.

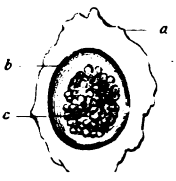


Fig. 8.

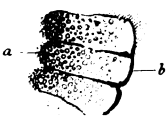
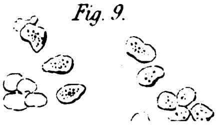


Fig. 9.



by collecting these, and showing the varied forms under which they may appear, will undoubtedly contribute much to advance the progress of surgical pathology.

It is, perhaps, proper to say in reference to the part which Mr Maclise has performed in the work, that the drawings are done with spirit and elegance, and, as pictorial objects, reflect much credit on his power over the pencil.

In conclusion, we think we may congratulate the student and practitioner of operative surgery on the appearance of this work, and the great value of the information which it will record for any future inquirer in the same department. Though we know that no surgeon can acquire by engravings that kind of knowledge which is the source of well-founded confidence, and though we know that confidence and dexterity in operation are to be acquired in no other mode than by frequent dissection, and great familiarity with the knife in the exposition of parts, we can safely recommend the present work as a valuable auxiliary to the labours of the dissecting-room, and an instructive guide to the operating surgeon.

[Appendix to Original Communications.]

## ART. XIII.—*Cases and Observations on the Molluscum Contagiosum of Bateman, with an Account of the minute Structure of the Tumours.* By ROBERT PATERSON, M. D. &c. Physician to the Leith Dispensary.

THE term Molluscum was introduced into cutaneous pathology by Dr Willan, to designate a disease characterized by movable tumours on the skin, little sensible and often elastic to the touch, and not affecting the general health of the patient.

Professor Tilesius had undoubtedly described the disease in the case of a beggar at Muhlberg in 1793, but without giving it a name; and we are inclined to think with Dr Jacobovics of Pesth,* that Dr Willan's term *molluscum* was more probably derived from Professor Tilesius's description, than, as Alibert and Biett think, from the resemblance of the tubercles to those on the bark of the maple tree.† The disease, however, which we are presently engaged with was not known to Dr Willan, and indeed was not known to Dr Bateman until after the publication of the second edition of his Synopsis, about the year 1814 or 1815. " A patient was sent to me," he says, " affected with a singular species of molluscum, which appears to be communicable by contact. The face and neck of this young woman were thickly studded with round prominent tubercles of various sizes, from that of a large pin's head to that of a small bean, which were hard, smooth, and shining on their surface, with a slight degree of transparency and nearly of the colour of the skin, the tubercles were all sessile, upon a contracted base without any peduncle. From the larger ones a small quantity of milk-like fluid issued on pressure, from a minute aperture, such as might be made by a needle's point, and which only became visible on the exit of the fluid. The progress of their growth was very slow; for the first tubercle had appeared on the chin a twelve month ago, and only a few of them had attained a large size,—some of the latter had recently become inflamed, and were proceeding to a slow and curdly suppuration; and the cervical glands lying under those on the neck were also swollen and discoloured, as if proceeding to suppurate. She ascribed the origin of this disease to contact with the face of a child whom she nursed, on which a tubercle of the same sort existed; and, on a subsequent visit, she informed me, that two other children of the same family were disfigured by similar tubercles." Since my attention," says Dr Bateman, " was drawn to this species of tubercle, I have observed it in another instance, in an infant brought to me with *porrigo (impetigo) larvalis*, and, on investigation, it was found that she had apparently received it from an older child, who was in the habit of nursing it In this case the milky fluid issued from the tubercles, and may be presumed to be the medium of the contagion."

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* Du Molluscum recherches critiques sur les formes la nature, et le traitement, par Dr Jacobovics de Pesth. 1840.

† " Reinhardi visu fœdum corpus tectum est verrucis mollibus sive *molluscis*, et madidis sive myrmeciis."

I am informed by my venerated preceptor, and respected friend, Professor John Thomson, that Dr Bateman, shortly after their occurrence, mentioned the above cases to him. Dr Thomson not having at that time witnessed any case of this disease, most anxiously looked out for it, and not very long after the time that Bateman described it, a series of cases occurred in the Canongate of Edinburgh, which not only put Dr Thomson's doubts at rest, regarding the disease in question, but also regarding its contagious nature. The series of cases to which I refer have been mentioned by Cazenave and Schedel in their work on diseases of the skin,* as having been mentioned to them by Dr Carswell, the cases having been witnessed by him and Dr Thomson. There is some little difference in the account which appears in Cazenave and Schedel's work, and the original account of the case as drawn up at the time, and inserted in Dr Thomson's case book.† Dr William Thomson has been kind enough to favour me with a copy of the case, as drawn up at the time by his lamented friend, Dr Donald M'Intosh.

*March* 1821.—" In a family resident in the Canongate of Edinburgh, there are three children, two boys and a girl, affected with *molluscum contagiosum*. About six months ago, small tubercles appeared upon the face of the eldest boy, who, it is supposed, had caught the disease from some of his play-fellows, although none of them at present are known to have had it, nor has it been known ever to have existed in the neighbourhood. From this boy the disease was communicated to his sister, and to his little brother, a child of about nine months old, whom he occasionally carried about in his arms. The contagious nature of the disease is well evinced in the child.

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* Abrégé Pratique des maladies de la Peau, par MM. Alphée Cazenave et H. E. Schedel. 2d edition, 1834.

† This may have arisen from Dr Carswell having reported the cases to the authors of the work in question from memory, and not from any intentional misrepresentation on Dr Carswell's part.

On the back of its hands a considerable number of tubercles are seen which have been produced by applying them to the face, and scratching those situated there during their inflammatory stage. Some of the tubercles are small, others large, some in a state of active inflammation, others nearly of the same colour as the skin, and quite free from pain. A few of them are pedunculated, but the greater of these number are attached by broad bases. They are seen on different parts of the face, on the forehead, eyelids, nose, lips, red of the lips, cheeks, and under the chin. Those under the chin have produced a considerable degree of inflammation of the skin, and tumefaction of the submaxillary glands. Two or three appear to be decaying, are shrunk and corrugated, and of a reddish brown hue. It is three months since the first appearance of the disease. The mother, though in the constant habit of nursing the youngest child, has not been infected."

I am also enabled, through the kindness of Professor Thomson, to add another series of cases of this rare affection, which, some time after the last mentioned ones, came under his observation.

Professor Thomson was consulted regarding the child of a farmer in the immediate vicinity of Edinburgh, who was affected with this disease in its characteristic form. It was traced to have been communicated to this child of the farmer's by a child of one of the farm servants; but this case could not be traced further. The farmer's child suffered severely from conjunctivitis, produced by the irritation of the tubercles on the edge of the eyelids. The disease was next communicated to the servant girl, who was in the habit of keeping the child during its illness, and appeared in its usual form on that side of the neck alone against which the child was in the habit of laying its face when affected with the ophthalmia. The above cases appear to me extremely interesting in so far as they point out in the most unequivocal manner the contagious nature of the disease.

The first case of this disease which I had an opportunity of witnessing occurred at the village of Newhaven in the month of December 1840. The child, a girl about eighteen months old, extremely robust and active, and belonging to one of the cleanliest and best class of fisher people, had been affected with the eruption for the last three months. It was first observed in the neighbourhood of the mouth and nose, and it now occupies the same localities together with the lower eyelids, and a few thinly scattered over the cheeks and neck. The mother states, that, when it was first seen, the tubercles had very much their present appearance. This child was nursed on one breast, and, although weaned, has the habit of still sucking it. The tubercles vary in size from that of a pin-head to a horse-bean,—the smaller ones having very much the white opaque appearance of pearly granulations, the larger ones being a little more coloured. The smaller ones are round, the larger ones oblong and irregular in shape, very much resembling that of a horse-bean. They are sessile on a contracted base, not pediculated. The larger ones only emit a whitish fluid when pressed. They seem to be not the slightest source of uneasiness to the child, and do not even appear painful when pretty roughly handled.

This child communicated the disease to the breast of the mother, and it appeared entirely confined to the sebaceous glands around the nipple of that breast, which the child continued to suck.

The tumours on the breast are of various sizes, from that of a pea to a hazelnut, three of the larger ones being clustered together, all exude a thick whitish matter when pressed between the fingers, and they seem to be equally insensible to the touch as those on the child. They first appeared on the breast about a month and a half after those on the face of the child.

The largest of these tumours latterly became inflamed and extremely troublesome, from the irritation of the rubbing of the clothes against them.

Particular inquiry was made as to any other members of the family being affected with a similar eruption; but no trace of it could be discovered, and an attempt to find out the source of contagion to the child proved equally unsuccessful; indeed, from the inquiries made, had any similar case existed in the village, it must have been discovered. This series of cases was seen by my friends, Professor Simpson, Dr W. Thomson, Dr Mercer, and Dr Lund, all of whom looked upon them as very characteristic of the disease in question.

*Treatment.*—Mrs C., the mother, was anxious that something should be done for the tumours, as they afforded her considerable inconvenience from rubbing against her dress, and, at the suggestion of Professor Simpson, the tops of them were touched with caustic potass. The application afforded little uneasiness to the patient; the escharotic destroyed a portion of the tumours, and the remainder soon sloughed off by their bases, leaving a healthy granulating surface, which healed kindly, and no return of them took place.

As the child's health was not in the slightest affected, no treatment whatever was had recourse to. The tumours as they enlarged generally suppurated, scabbed, and then fell off by their base, and as this happened to more of them than was generated, a decided diminution soon took place, and at the present time there are only a very few remaining.

Case II. presented itself at the Leith Dispensary for consultation on the 2d of April last. The child, Ann M'Queen, 2 years old, strong and healthy, has been affected with the disease for the last two months. The mother ascribes it to her having been carried about by a girl who had some "similar lumps" upon her body, while they resided at Dundee, and immediately before they came to Leith. The eruption at present occupies the left side of the neck and shoulder, and a few are scattered here and there upon the same side of the face and trunk of the body. The disease resembles very much in appearance the case last described. The small tumours have the same pearly appearance, and the larger ones, being slightly redder than the skin, and exuding a milky fluid from the orifice at their apex. The tubercles at present appear in groups, and irregularly scattered over the surface of the skin; their number may be from thirty to forty on the present patient. The mother states that the girl, who was primarily affected at Dundee, used to carry this child chiefly against that side of her neck. But neither the mother nor any other of the children in the family have any appearance whatever of the eruption. This, however, may be partly accounted for by the fact, that the dress of this child being tied up round the neck, prevents, in a great measure, at least, any immediate contact between the eruption and the skin of the other children. Several of the largest of these tumours were cut off with a pair of scissors, and the skin healed well afterwards; others were destroyed with the caustic potass and nitrate of silver, but still the number of them on the body of the patient is not much diminished.

The next case which presented itself was that of a young married man, whose wife I had attended in labour some weeks previous. It was observed during the progress of the labour, that numerous small tumours existed at the orifice of the vagina, and in the neighbourhood of the vulva, but, thinking that they might be condylomata, or warts, no further attention was paid to them. The husband, however, shortly after showed me a number of tumours on the penis, which bore the characteristic marks of *molluscum contagiosum.* Upon inquiry regarding similar tumours on his wife, he informed me that they were of the same kind as those on his penis. They occasioned him considerable annoyance, and he applied for the purpose of getting them removed. The larger ones were cut off with the scissors, and the smaller touched with nitrate of silver, and they have all entirely disappeared.

Since the above cases occurred, I have had an opportunity of witnessing a beautiful and well-marked case of this rare disease, occurring in a child under Dr Henderson's care in the Royal Infirmary.

This disease is as yet to be regarded as entirely British,—the latest authors in France, Germany, and America, making no mention whatever of it in their respective countries. We find Rayer, indeed, who wrote in 1827, and who is for referring the molluscum of Bateman to disease of the sebaceous follicles, saying, "etaient ils autre chose que des tumeurs folliculeuses? est-il bien démontré que cette affection soit réellement contagieuse?" It would appear from the cases which we have quoted, and from those which we have ourselves observed, that the disease has now been seen sufficiently often to enable us to answer M. Rayer's question in the affirmative. Dr Craigie, many years ago, saw reason to infer, from a case of the chronic molluscum which he communicated to the London Medico-Chirurgical Society, that this disease arises from "some morbid or vitiated state of the sebaceous follicles;" * and we have strong grounds for referring the contagious species with M. Rayer to disease of the sebaceous glands. The drawing of enlarged sebaceous follicles in M. Rayer's work on Diseases of the Skin is sufficient to show this, and resembles very much, indeed, the species of molluscum at present under consideration. Besides this fact, however, the position of *molluscum contagiosum* is principally that where the sebaceous glands are most numerous, as at the angles of the nose, mouth, and eyes; and in several attempts which we have made to inoculate the white matter of molluscum into healthy skin, they have all been attended with failure; while in one attempt which was made about a week previous to the period I write this, a slight enlargement is taking place over the follicle already, which leads to the suspicion that a tubercle is about to form on the spot. Nothing as yet, however, can be spoken positively of this observation.

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* Craigie's Pathological Anatomy, p. 643.

*Structure of the Tumours of Contagious Molluscum.*—Dr Bateman having mentioned that the milky fluid which these tumours exude seems to be the medium of contagion in this disease, it appeared that it might be of advantage to examine the appearance of the milky discharge, and the structure of the tumours under the microscope. For this purpose, one or two of them were removed from the skin of Case II. on the occasion of her presenting herself at the Leith Dispensary on the 2d of April. The same afternoon, they were examined by my friend, Professor Reid, and myself, under his microscope, and a structure which we were unacquainted with, and which appeared to us peculiar, was noticed. Some days afterwards I removed one from Case I., which exhibited the same appearances; and, more lately, the tumours from the penis of Case III. presented analogous characteristics. Since then, I have had many opportunities of examining these tumours, taken from Case II., and more lately, through the kindness of Professor Allen Thomson, under his very powerful microscope. The magnified drawings which are annexed, with the exception of Fig. 7, are either represented as seen by Professor Reid, and delineated under his own eye, or by Professor Thomson, and kindly delineated by him.

The structure of the tumours is that of numerous cells, which secrete a whitish milky fluid. This is received from the cells into a central cavity, or irregular-shaped canal, in the interior of the tumour, which conveys the secretion to the orifice of it, where it exudes spontaneously, or on the application of pressure. The cells of which the tumours are composed, when examined after the removal of the skin and cellular tissue, and while they are still covered with their investing membrane, have an irregular quadrilateral shape, some being five-sided, and presenting a very similar appearance to the cells of a honey-comb. This is shown in Fig. 4 and 6. When a thin section, however, is made of the tumours, and placed under the microscope, they are seen to have a long irregular shape, their external extremity being in contact with the investing membrane of the tumour, their internal one being prolonged into a nipple-like prominence. At the same time they are observed to be filled up with the peculiar globules of which the milky fluid is composed. Towards the external extremity of the cells, however, (Fig. 7, *a*,) the globules are observed to be less distinct than at *b*, the internal extremity. When the peculiar milky fluid is placed under the microscope, it is observed to be entirely composed of nucleated cells. These are very irregular in their shape, some being oblong, others ovate, and others having one side straight and the other of an irregular oval, see Figs 8 and 9. They vary also a little in size. Fig. 9 represents one of a medium size, magnified about 500 diameters. They are found to be about the 1000th part of an inch in size, being, consequently, two and a-half or three times the size of pus globules, and three and a-half times as large as those of blood. This body will be observed to consist of an external, thin, and transparent membranous vesicle, (*a,*) somewhat flattened in its shape, and when these bodies are massed together serving to unite them; and of an external vesicle, (*b,*) generally filled, as represented in the figure, with small granular matter. This granular mass, (*c*), in some, filled completely the tunic vesicle; in others, as in that represented, Fig. 10, it receded from its inner wall. These nucleated granules have, in fact, some resemblance to those of the epithelium. Some of the granules do not possess the external vesicle as seen in Fig. 9, and others possess it of larger size. This Professor Thomson is inclined to attribute to the more or less mature state of the secretions. The external vesicle not being yet developed until it reaches very nearly the free surface of the secreting cells, in this way the smaller size of the vesicles towards the outer extremity of the secreting cell, and their large size towards its internal or mammillary extremity, is easily accounted for—the external scale or vesicle not being at first developed, but its development and increase in size taking place as it becomes fit for evolution. In this way we find that the formation of this diseased structure is very similar to the development of animal and vegetable tissue, and not unlike that which Müller has described as taking place in the development of some kinds of carcinomatous structure.

The manner in which this disease must be communicated resembles much the account which Schwann and Schleiden have given of the development of animal and vegetable tissue.* The nuclei protrude young cellules, which project from their surface as the watch-glass from the watch. As growth proceeds, the young cell increases in size, while the nucleus remains imbedded in its wall." "Fresh nuclei form within the cavity of these young cells, and from a repetition of this process result successive generations of cells. The walls of the young cells are perfectly transparent, but those of the older cells become thickened, and in animal tissues often converted more or less into a fibrous structure." When one of these peculiar granules of which the milky fluid of this disease is composed, enters a sebaceous follicle, a similar process to that just described of nucleolar increase and cellular development take place,—the external vesicle of the primitive cell soon assuming a fibrous structure, and constituting the investing membrane of the subsequent tumours.

The peculiar cells of which the white fluid is composed are easily distinguished by a very moderate magnifying power, and appear to be peculiar to this disease, in so far as I have been able to observe. With this view I have observed microscopically the contents of atheromatous and melliceritious tumours, the contents of sebaceous follicles in health and in disease, &c., but have not been able to see anything similar. As a proof of their being easily distinguished again under the microscope, I found a small abscess at the base of a cluster of these tumours on the neck of one of the patients. I took some of the contents of it, for the purpose of examining whether or not it might be the same secretion as the molluscum; but it was found entirely composed of pus globules. The milky fluid of the molluscum was then mixed with it, together with some blood globules, and the vesicles of molluscum, being much larger than either of the other two, were easily distinguished; and, although the magnifying power was not more than 100 diameters, the distinction between the three sets of globules was easily made out.

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* On the Nature and Structural Characteristics of Morbid Growths, by J. Muller, M. D., translated by C. West, M. D. 1840, p. 21.

*General Observations.*—We have already mentioned that this disease appears to be entirely British; no case of it having as yet been recorded in so far as we are at present acquainted in the records of any other country. It will, doubtless, however, be sooner or later noticed in other countries.

It would also appear to be entirely an infantile disease; at least primarily, by which I mean that the first of a series of cases (the aboriginal one) has always been an infant. The first case that Dr Bateman saw, that of a young woman, received the contagion from a child affected with the disease, whom she nursed; two other children of the same family were also affected with it. The second case was also that of an infant who had apparently got it from an older child who was in the habit of nursing it. The series of cases which Cazenave and Schedel have related, and which occurred to Drs Carswell and Thomson, first appeared on a young boy, next upon a girl, and then the infant at the breast.

The case which has been related on the authority of Professor Thomson, and which occurred in the country, originally appeared in a child of one of the farm-servants. This child communicated it to a child of the farmer's, it being thus conveyed by the most direct contact to the neck of the servant girl who kept the last mentioned child.

Dr Henderson's case, where, I believe, he could not trace the contagion, also occurred in a child, and the two first series of cases which have been related occurred in children. The first case appeared on a child, and was communicated to the breast of the mother. The second case was communicated to the child by an older child that nursed her. The third case which I have related cannot be adduced either in evidence for or against, as, from delicacy, it was impossible to gain any satisfactory information from the parties. We have every reason, therefore, for believing that it is a disease, if not entirely originating in children, as certainly most frequently originating in, and being communicated to children, and therefore to be looked upon as truly an infantile disease.

*Character of the Eruption.*—The eruption in all the four cases which I have witnessed has borne a striking resemblance to each other. They all commenced in the shape of minute pearly granulations, and, increasing in size, became more of the natural colour of the skin. When of the size of a vetch, a minute opening generally became visible on their apices, and emitted a whitish milky fluid on pressure; as the tumours enlarged, they became irregular in shape and "sessile upon a contracted base." Their size varied from a pin-head to a hazel-nut, and their progress in reaching the largest size was very various, but generally slow. In Bateman's case a twelvemonth had elapsed between the period at which the tubercles begun, and that at which the application was made.

In Case II. they followed a much more rapid course than in any of the other cases. They may be looked upon as most generally occurring in irregular clusters of 3, 5, and sometimes even 20. This character is distinctly to be noticed in Dr Bateman's plate, and is beautifully pourtrayed in a delineation of the first of Dr Thomson's cases, which exists in his magnificent collection. In all the cases we have seen, this fact has been noticed. Although they bear a very chronic character they appear to undergo spontaneous destruction and cure.

When this takes place, either a slow suppuration is established, which soon leads to the shrinking up and death of the tumours and their subsequent falling off; or, as we have seen when they were frequently irritated by picking them with the fingers, inflammation was excited, which soon led to the shrinking up and death of the tumours before any suppuration was established.

The *Molluscum contagiosum* appears not to be a disease of a dangerous nature. The case which Cazenave and Schedel relate on the authority of Dr Carswell, proved fatal, but whether from this disease or any other is not stated. The case which lately occurred in the Royal Infirmary, under the care of Dr Henderson, proved fatal; but we believe that death did not take place from the cutaneous disease. All the other cases which have been recorded were of an extremely mild nature, and, indeed, unless from the irritation of the tumours in the neighbourhood of the eyelids and mouth, giving rise to conjunctivitis and slight irritative fevers; the disease might be said to be one without even uneasiness. Sometimes, however, we find that the conjunctivitis proves very distressing. Professor Thomson informs me that the farmer's child, which has been previously mentioned in his second series of cases, ran great danger of losing its eye-sight in consequence. Another annoying affection which has been mentioned by Dr Bateman, and occurred to a considerable extent in Professor Thomson's and Dr Carswell's case, was an enlargement of the glands in the neighbourhood of the eruption. This latter is very likely to occur in consequence of the irritation of the eruptive disease on the skin in their immediate neighbourhood.

*Treatment.*—We have already mentioned the course which nature follows in getting rid of these tumours, and in one case we allowed her to keep the treatment in her own hands till nearly a perfect cure was established.

In other cases, however, their progress is slow, troublesome, and they disfigure the person; it is, therefore, necessary to do something for their removal. Professor Thomson found in his experience the sulphate of copper, both in strong solution, and applied solid, effected the destruction of the tumours with sufficient rapidity. Previous to my being aware of the observations of Professor Thomson, I had applied the solid nitrate of silver to the tops of the tumours, and in one case I used the caustic potass, which certainly proved by far the most speedy and effectual method of cure. From the insensibility of the tumour the application of escharotics gives rise to no pain, and their destruction is speedily effected.

We have not given a proper trial to internal remedies in this disease. Dr Bateman, however, found in his first case, that, after administering the arsenical solution in small doses for a month, "the tubercles were universally diminished, both in number and magnitude, most of them having gradually subsided, a few, especially on the neck, had suppurated." We have tried the arsenical solution in small doses, in Case II. it was not, however, continued so long. We also tried the *Aq. Potassae*, and found no appearance of improvement whatever, although both sets of remedies were continued for about a fortnight. Indeed, during their administration, the disease seemed to follow its usual course of production and of spontaneous suppuration and decay. In Case I. also, the disease followed a very similar course to what Dr Bateman has described, and has become nearly free of the affection, although no treatment whatever has been had recourse to. With regard to other remedies, we have made no trial whatever of them, and are inclined to look upon internal remedies in general as too tedious, when the local ones can be applied with so little pain to the patient, such surety to the destruction of the tumours, and in so much a shorter space of time.

### *Explanation of Plate.*

Fig. 1. Represents the appearance of the face of case first, who communicated the disease to the breast of her mother, while the neck of the same figure shows the appearance which case second presented, having received the disease from a girl that nursed her. Both the children were females, and about the same age,—two years.

Fig. 2. Shows a patch of skin on which the disease from the shoulder of case second is represented of nearly the natural size.

Fig. 3. Represents the tumours in profile.

Fig. 4. Represents the appearance of the tumours when deprived of the skin and cellular tissue; the transparent investing membrane distinctly shows the shape of the cells shining through it.

Fig. 5. Represents a section of one of these tumours, *a.* the cells of which they are composed, discharging the milky fluid towards *b.* the canals or cavity, which conduct it to *c.* the orifice.

Fig. 6. Represents an enlarged external view of the base of the cells with their shape and arrangement.

Fig. 7. Represents cells under the compressor, and the milky fluid escaping.

Fig. 8. Gives a magnified representation of the cells. Upon a thin section being made, and placed under the microscope, the peculiar granules of which the milky fluid is composed, are distinctly seen occupying the cells, and increasing in size as they reach the nipple-like prominence and cavity of the tumour; *a.* the internal extremity of cells, and nipple-like prominence; *b.* the external extremity; *c.* the peculiar granules.

Fig. 9. Represents the peculiar globules of the milky secretion of this disease. They are observed to be of irregular shape, oblong or oval, and to contain nucleoli.

Fig. 10. Represents a medium sized granule, of which the milky fluid is composed, magnified about 500 diameters; the granule itself is about $\frac{1}{1000}$ of an inch in diameter. *a.* represents the external cell; *b.* the vesicle or granule; and *c.* the granulated nucleus.

# PART III.

## MEDICAL INTELLIGENCE.

### ANATOMY AND PHYSIOLOGY.

*On the peculiar disposition of the Arteries of the Uterus.* By M. **Bricquet.** (*Bulletin de l'Academie Royale de Medecine*, 16th March 1841.)—The arteries of the uterus during pregnancy, besides their increased diameter, also acquire an increased elongation, which renders them tortuous, even whilst the uterus is still filled with the products of conception. When the uterus, however, has expelled its contents, whether at or before the full period, the arterial sinuosities, in consequence of the contraction of the walls of the uterus, increase so as to touch each other by their convex surfaces. The plane of the circles to which these belong is then parallel to that of the coats of the uterus: but, as the uterus goes on diminishing in size, the sinuosities not being able to increase any further in that direction, bulge out in another, perpendicular to the plane of the coats of the uterus. In this state, the arteries, instead of forming simple bendings or sinuosities, present the appearance of spiral or helicine vessels, which retain this form during the whole time the uterus is returning to its former contracted state. M. Bricquet found that this helicine or spiral disposition of the uterine arteries, once produced, is retained ever after, and is not lost during life He thinks this fact will prove a valuable addition to our stock of knowledge, as to the medical jurisprudence of pregnancy, as he asserts that this appearance is never produced but by pregnancy, and is never met with in the unimpregnated womb.

*Case of Secretion of Air from the Human Skin.* By Sir **Francis Smith.** (*The Dublin Journal of Medical Science.* January 1841.) An hypochondriac gentleman, 35 years of age, informed Sir F. Smith that he was liable to immense disengagements of gas from the stomach; that he also occasionally discharged air from the urinary bladder; and had observed an escape of air from the surface of his body when under water in the bath. Little attention was paid to the last of these statements till the 15th of May 1840, when Sir F. Smith was hastily summoned to the bath to see the phenomenon of the disengagement of air from the skin of his patient. He was found in a bath at 79°, and his chest, abdomen, shoulders, and hands were literally covered with small air bubbles. When he removed his hands from the bath, the bubbles disappeared, but when he replaced them below the water, the air bubbles were observed to make their re-appearance, at first very minute, but gradually increased in size till the palms of his hands became again coated with them. He frequently wiped away the bubbles from his hands and chest, but in every case they were soon replaced by others. The bubbles of air ran together, when pushed with the finger, like globules of mercury, without quitting the skin, or becoming loose in the water. This circumstance was observed for twenty minutes by Sir F. Smith, and towards the end of that time the margins of the upper end of the bath opposite where the shoulders had been, were coated all round for a depth of about two inches, with minute bubbles of air.

## MEDICAL PATHOLOGY.

*Further facts regarding the Identity of Small-Pox and Cow-Pox.* By Dr Basile Thiele of Kasan in Russia. (*Bulletin de l'Academie Royale de Medecine*, January 1841.)—In the spring of 1836, Dr Thiele inoculated the matter of small-pox on the udder of some cows; pustules were produced which bore all the characters of the true vaccine vesicle in those animals. The matter from these vesicles was applied by puncture to the arms of several children, and produced the true vaccine disease; only that the local symptoms were more intense, and the consecutive fever more severe. The vaccine lymph thus procured was carefully observed during seventy-five successive transmissions in the human subject, and appeared always to retain its normal character.

During the spring of 1838, M. Thiele repeated his former experiments with the same success. The cows chosen were from 4 to 6 years old, and they were inoculated with the small-pox matter on the posterior part of the udder. Whether the matter used was taken from mild or severe, from the single or the confluent form of small-pox, the vesicle produced on the udder of the cow was always of the same mild character, and the lymph obtained from it proved equally mild when applied to the human system. In general only a third of the inoculations succeeded. On the third day, slight induration of the cellular tissue at the seat of the puncture was observed. On the fifth a pustule formed; from the seventh to the ninth it had the appearance of a vaccine vesicle; from the ninth to the eleventh it began to desicate and form a crust, which fell off a few days after, leaving a deep cicatrix; from the fourth to the seventh day the circulation of the animal was slightly accelerated, and its temperature increased, but its general health appeared to remain unaltered.

Dr Thiele satisfied himself, from experiment, that the virus thus obtained from the cow ought to be allowed to remain dry on glass for five or six days before being used, and then mixed with a little fresh warm milk before being applied to the arm of the infant. The vesicles resulting from the vaccination of this lymph appeared in every respect similar to those of the ordinary vaccine vesicles. During the first transmissions through the human subject, Dr Thiele observed two separate febrile attacks; one from the third to the fourth day, and the other from the eleventh to the fourteenth day; in this respect still bearing some analogy to small-pox. He says that this double febrile accession is not got the better of till about the sixth transmission, and that it is not till then that it is safe to give up mixing the lymph with warm milk previous to vaccination. To the neglect of this precaution he attributes the occurrence of some cases of true small-pox eruption after vaccination, with this lymph during its earlier transmissions; but he immediately afterwards mentions a circumstance which appears to invalidate the statement as to its being true small-pox eruption; for he states that some of this matter, taken and mixed with milk, communicated the vaccine disease to other children, and remained as vaccine lymph in all its subsequent transmissions.

*On the non-occurrence of Albuminous Urine during the Dropsy which follows Scarlatina.* By Dr Philipp of Berlin. (*Casper's Wochenschrift fur die Gesammte Heilkunde.* Nov. 1840.)—The results of Dr Philipp regarding the occurrence of albuminous urine during the dropsical symptoms which follow scarlatina, are at variance with what have been observed in this country. In an epidemic scarlatina which raged at Berlin, he ascertained in sixty cases that the urine was not albuminous, though the dropsical symptoms were fully developed, and could only be traced to this complaint. The dropsical symptoms appeared at shorter or longer intervals, often four or five weeks after desquamation. The urine was tested both by means of heat and of nitric acid, but by neither of these was the slightest trace of albumen discovered. He is inclined to attribute this to the rarity of disease of the kidney at Berlin, seeing that for the last two years only two cases of Bright's disease of the kidney have been noticed. The scarlet fever, too, appears to vary somewhat in its type from that which occurs in this country, as he mentions that the deaths from this affection generally result from its complication with croup, as he calls it, or cerebral disorder. Dr Philipp mentions that the dropsical symptoms are so mild and unattended with danger, that, though they occur in most cases, he has not met with one which proved fatal.

## THERAPEUTICS.

*On the best mode of employing Electricity or Galvanism in the Cure of Neuralgia.* By M. C. James. (*Gazette Medicale de Paris,* 24th October 1840.)—M. James states that the following mode of applying galvanism or electricity to nerves suffering from neuralgic affections, rarely fails in effecting a cure. He is inclined to attribute the numerous failures which other practitioners have met with in the use of this remedy, to the circumstance, that the electric fluid was never made to pass through the nerve at all, but alongst the skin merely,—rarely, if ever, being made to penetrate to the affected nerve. A fine needle, of about two inches and a half long, made of some metal which is not easily oxidized, platina or gold being the best, and finely polished, is introduced into the seat of the affected nerve. The needle is recommended to be pushed straight down at once to the affected nerve, and not to be turned round, as is often done in introducing needles into rheumatic parts. All needles composed of metals which are oxidizable are condemned as hurtful, both because they give pain from their loss of polish, and from their causing an indelible stain in the spot where they are introduced,—a circumstance which is especially to be avoided when operating on the face or other exposed parts of the body. The neighbourhood of important blood-vessels, is, if possible, to be avoided; at least, they should not be transfixed. It is not, however, indispensable to pierce the nerve; it is stated that it is sufficient if the needle be in contact with it. Two needles are generally requisite,—one at the origin of the affected nerve, the other towards its affected terminating branch. The introduction of the needle rarely gives pain.

The needles being fixed, a current of electric fluid is made to pass along the nerve, the positive pole being put in communication with the needle fixed in the origin of the nerve, and the negative pole with the needle inserted at the extremity of the branch. The voltaic pile of five or six plates usually furnishes a sufficiently powerful current for the first sitting. The electro-magnetic apparatus of Mr Clark of London is recommended as being that which is both most convenient, and whose intensity can be increased most easily at will. The wires of the electric apparatus are only kept in contact with the needles for a few seconds; in some cases, however, a continued current of the electric fluid is made to pass along the nerve. A kind of pricking pain is experienced under the influence of the electricity, most acute at the negative pole.

Several sittings are required before the neuralgic pain leaves the nerve; after it does leave it, however, the application must not be immediately discontinued, as sometimes it returns. It is, therefore, recommended, before withdrawing the needles, to wait for a few minutes, and direct the person to make the motion which usually brought on the pain; if it returns one or two additional shocks, passed along the nerve, will make it completely disappear. No after treatment is necessary; and when properly performed, the punctures give no uneasiness, and require no treatment.

M. James relates a number of instructive cases of neuralgic affections of the nerves, which occurred chiefly in the practice of M. Magendie, who is the great advocate for this mode of treating neuralgia, which were relieved by the use of electricity.

*On the prevention of Pitting in Small-pox by means of Sulphur Ointment.* By Dr V. Midaveine. (*Annales de la Societé de Medecine de Gand*, December 1840.)—The danger of applying mercurial perparations to the whole surface of the body induced Dr Midaveine to seek some other means which would be more generally applicable, and yet possess an equally modifying power over the variolous pustule. From the success he obtained in sixteen cases of small-pox, he thinks he has found in sulphur ointment a remedy equally efficacious in preventing the maturation of the pustule and the subsequent pitting, as the mercurial preparations, whilst its application is not attended with the same danger to the patient. He employed it of the strength of one and a-half to two drachms of flowers of sulphur to each ounce of lard, the smaller proportion being used for the varioloid affection, the larger for the confluent small-pox. The whole body is rubbed with this three times daily; and the sooner the application is made after the appearance of the eruption, the greater is the chance of its speedily arresting its developement. The pustules shrivel and dry up under this treatment, the appetite speedily returns, and convalescence is soon established.

*On the utility of Oxalic Acid in Inflammations of the Mucous Membranes.* By M. Nardo. (*Repertorio delle Scienze Fisico-Mediche del Piemonte.* January 1841.)—At the scientific meeting at Turin in September last, M. Nardo made known the results of his experiments on the therapeutic effects of oxalic acid; to which subject he had been devoting his attention for the last twelve years. From his experiments he concluded that this acid possesses antiphlogistic properties superior to that of any other vegetable acid, as the malic, the citric, the acetic, or the tartaric, and that, in addition, it possesses the precious property of calming the violent pain which attends inflammation of the mucous membranes. He especially recommends its employment in all diseases where this membrane is implicated, as in angina, gastritis, gastro-enteritis, stomatitis, and aphtha. He says that the use of oxalic acid renders the loss of blood much less necessary. The dose he employed was one and a-half grain in about eight ounces of fluid. It is not mentioned how often it ought to be repeated. He regards it as a contra-stimulant.

## SURGERY.

*Two cases of Goitre cured by Ligature.* By M. J. Bach of Strasbourg. (*Gazette Medicale de Paris*, 2d January 1841.)—Henri Klein, aged 30, first perceived an enlargement in the front of the neck, about ten years ago, which gradually but slowly enlarged, until it attained such dimensions as to become very troublesome, from its pressure on the larynx and trachea. The tumour was moveable, though adherent by a pretty broad base. It felt at certain points hard, almost cartilaginous or osseous, whilst in others it was soft and presented fluctuation. It extended upwards to within two finger-breadths of the ramus of the lower jaw, and downwards to about the same distance from the clavicle, displacing outwards the sterno-mastoid muscle and carotid artery on the right, and pushing the larynx inwards and towards the left.

M. Bach having resolved to free him of this tumour by operation on the 25th of July, made a crucial incision over the centre of the tumour, and, after dissecting back the flaps of skin thus formed with his fingers, broke down all the cellular attachments of the tumour, and turned it out, leaving it still, however, attached by its vascular base. Around this a strong ligature was placed and moderately tightened, the ends of the ligature being passed through a silver tube, in order to admit of the pressure being increased as required. Lint dipped in cold water was then laid over the tumour, and was directed to be frequently renewed. The patient was then put to bed.

The constriction was twice increased during the day as the ligature became looser, but was never drawn tight. At each time when the ligature was tightened, pain in breathing and swallowing was complained of, as well as a pain which extended towards the nape of the neck.

On the 26th, pretty intense reaction had come on, requiring blood-letting, and the tumour had become of a black colour. Puncturing it with a needle gave no pain. The ligature was twice tightened on this and the following days.

On the 31st, the tumour had become moveable, and emitted a strong gangrenous odour. It was therefore cut off before the ligature, leaving this still in its place, and tightening it still further.

By the 5th of August the pedicle had completely disappeared in consequence of the free suppuration which had been established, the flaps of skin were therefore brought in contact over the wound by means of adhesive plaster, and by the end of the month he was dismissed cured.

In the other case the man was 27 years of age, and the tumour about the size of an orange. Instead of the crucial incision, a simple transverse incision was made, the tumour turned out in the same way, and the ligature passed around its root, gradually and daily tightened. On the fourth day the tumour was cut off before the ligature; on the sixth day the ligature itself was removed; and by the thirtieth day after the operation he was discharged cured.

M. Bach considers that all goitres are not curable by operation. When the enlargement of the thyroid body depends on the presence of cysts in its substance, or when it is simply enlarged, as in simple goitre, or even when it presents a scirrhous induration, provided in all these cases the adhesions are not too extensive, or the base too broad, M. Bach thinks may with propriety be operated on. In that form which he denominates the aneurismal, and in that depending on developement of the parenchymatous structure, he recommends that no operation be attempted, the first being beyond the reach of art, the other yielding to medical treatment. He recommends the ligature in preference to the knife in every case, and urges the necessity of making the pressure very moderate, for the first three days at least. In this way, he says, acute pain is avoided, and the patient is not exposed to violent fits of suffocation, nor to hemorrhage from the ligature cutting through the morbid vessels, nor to phlebitis, symptoms which are but too apt to come on if this be not attended to.

*Cases of Section of the Muscles of the Tongue as a cure for Stuttering.* By M. AMUSSAT. (*Comptes Rendus de l'Academie des Sciences*, 8th February 1841.) M. Amussat exhibited to the Academy of Sciences two persons whom he had cured of stuttering by dividing the genioglossal muscles. The first case was a child 11 years of age, and the second a man of 40; both stuttered very badly, and their pronunciation was otherwise thick and difficult. The operation was performed in the following manner.

The mouth was opened as far as possible, and the tongue turned upward and backwards. The stretched frœnum of mucous membrane was then cut in a perpendicular direction with a pair of scissors as its lower part, between the two canals of Wharton; after which the aperture in the mucous membrane was enlarged laterally and downwards. The tongue was then drawn forwards and stretched upwards beyond the mouth, when the tense muscles, being distinctly visible, were easily divided, so far as requisite, with a scalpel or a pair of scissors.

M. Amussat prefers dividing the muscles pretty close to the origin, both because they are more easily got at, not having yet spread like a fan over the tongue, and because there is little or no danger of dividing any blood-vessel or nerve in that situation. He has since operated on a great number of cases with the most satisfactory results.

MM. Dieffenbach, Velpeau, and Roux have several times performed this operation, and all speak highly of it. Dr Philip of London, and many other British practitioners, have also performed the operation with complete success.

M. Dieffenbach, in a letter addressed to the Institute of France, and published in the Gazette Medicale de Paris, for 13th March 1841, describes his modes of operating. He has operated on nineteen cases in all, and employed three different modes; *1st*, cutting out a triangular-shaped piece from the root of the tongue, consisting chiefly of the genioglossus muscle; *2d*, making a simple horizontal section of the root of the tongue; and *3d*, cutting through the entire muscles of the tongue, at its root, without dividing the mucous membrane. Considerable hæmorrhage attended the first and last of these modes of operating, from the blood-vessels of the tongue having been divided; little or no hæmorrhage followed the second mode of operating, but it does not appear to have been approved of by M. Dieffenbach, as the stuttering was scarcely relieved after the cure was complete. He remarks that wounds of the tongue heal with extreme rapidity, three days in general sufficing to render the union firm. In his first and last mode of operating he introduces ligatures of silk, both to restrain the hæmorrhage and keep the divided parts in contact. He places the sutures pretty close to each other, and does not remove any before the fourth day, some more on the fifth, and the last on the sixth day after the operation.

M. Dieffenbach gives the preference to his first mode of operating, viz. cutting out a triangular portion from the root of the tongue, fourteen of his nineteen cases having been operated on in this manner. In all these the stuttering was removed after the cure was completed.

## TOXICOLOGY.

*Case of Poisoning with Ammonia.* By M. ALPHONSE SOUCHARD.—(*Annales d'Hygiene Publique*, January 1841.)—A young man, an apprentice to a chemist at Batignolles, had retired to bed in a small closet attached to the laboratory, when he was awakened by a sensation of violent constriction in his throat, and difficulty in breathing. He got up and tried to reach the laboratory, which he had no sooner done than he felt himself completely suffocated, and would infallibly have perished if a woman, who heard his feeble cries, had not come to his assistance, and dragged him out at the imminent risk of suffocating herself. A large flask containing nearly fifty pints of the volatile alkali had been received that evening, and the increased heat of the apartment, from dilating the fluid, had burst the flask, and allowed the contents to escape. The young man had probably been exposed to the ammoniacal vapour for about three-quarters of an hour.

When seen by M. Souchard he had an extremely anxious look, and his face was covered with livid streaks, more numerous about the mouth and nostrils. The mucous membrane of the mouth and nostrils appeared to be destroyed, and from the mouth and nose there flowed an abundant discharge of bloody coloured frothy matter. The tongue was of a bright-red colour, and seemed deprived of its cuticular covering, and was covered here and there with white concrete mucus, resembling patches of false membrane. The whole cavity of the mouth presented the same appearance. The voice of the patient was very feeble, and he complained of a cutting pain in the throat, which soon extended to the whole breast.

There was extreme difficulty of breathing, and he was continually threatened with fits of suffocation. His thirst was very great, but deglutition was found to be almost impossible, any attempt to swallow exciting a painful cough, during which he expectorated a little clear mucus. The pulse was feeble, irregular, but very quick. No convulsions were observed.

The patient was largely bled, and water acidulated with vinegar was injected in large quantities, (it is not stated whether by the mouth or the rectum.) By the end of a couple of hours he felt easier, and the pain in the breast abated, but soon after the throat became more painful, and deglutition became absolutely impossible. By means, however, of frictions, astringent gargles, leeches to the throat, purgative injections, and baths, he was declared to be out of danger by the end of 48 hours. Loss of voice continued for six days, but after this period he rapidly recovered.

*On the Hydrated Peroxide of Iron as an antidote for Arsenic.* By M. ORFILA. (*Bulletin de l'Academie Royale de Medecine,* 16th March 1841.)—In a recent case of poisoning by arsenic in Paris, the physician administered colcothar, or the anhydrous oxide of iron, instead of the hydrated peroxide: no relief whatever was experienced, and the unfortunate patient died. M. Orfila, with the view of determining the merits of these two preparations, made a number of experiments, from which it results that the colcothar, or anhydrous oxide of iron, possesses no antidotal power whatever, as it requires twelve ounces and a half of it to neutralize a single grain of arsenious acid.

It appears, however, to be proved that the hydrated peroxide of iron does to a certain extent act as an antidote to arsenious acid, and many experimentalists have shown that, if a sufficient quantity of this substance be given, the poisonous symptoms caused by arsenic are removed. It has been doubted how much of this effect was owing to the peroxide possessing the properties of a chemical antidote, or whether it merely acted by its mechanical properties of enveloping the arsenic and preventing its acting on the stomach. That it possesses the properties of a chemical antidote the researches of Guibourt, Deville, Nouat, Sandras, and of Dr A. D. Maclagan, abundantly prove; at least they prove that arsenic is removed from its solution in water by the hydrated peroxide of iron forming a chemical compound, apparently insoluble in water. The quantity, however, of the peroxide required to produce this effect varied greatly in the experiments of these gentlemen; for whilst Dr Maclagan found that twelve parts sufficed to neutralize one of arsenic, Guibourt found that about sixty were needed.

M. Orfila, admitting the correctness of the statement as to the hydrated peroxide of iron entering into chemical combinations, and forming with arsenic a compound insoluble in water, performed a number of experiments, for the purpose of ascertaining whether this apparently insoluble compound was not liable to be acted upon by the juices of the stomach and still produce poisonous symptoms, as MM. Nonat, Deville, and Sandras had previously announced that the compound was still poisonous. M. Orfila, therefore, administered to several strong dogs, seventeen grains of arsenic with eight drachms of the dried hydrated peroxide of iron. This was allowed to form a chemical combination previous to its administration, so that not a particle of free arsenic could be discovered in it, and it admitted of being boiled in water without imparting to that fluid the slightest trace of the poison. In all the dogs, copious alvine evacuations were induced, together with the usual symptoms of poisoning by arsenic. They all died in from 28 to 40 hours provided vomiting was prevented; and on examining their bodies arsenic was detected in the urine and liver. The alimentary canal, however, presented scarcely any marks of inflammation.

From these experiments, M. Orfila concluded that the dry hydrated peroxide of iron absorbs and neutralizes a considerable quantity of arsenious acid, forming with it a sub-arsenite of iron, still poisonous, but less so than arsenious acid itself; that the poisonous effects of this compound are apparently due to its being decomposed by the acid contents of the stomach, which set free the arsenious acid, and allow of its being absorbed; that it is, therefore, a wise measure in cases of poisoning by arsenic, to administer the dry hydrated peroxide of iron, after having mixed it with water, and then to excite vomiting, which both expels the arsenic itself from the stomach, and the sub-arsenite of iron formed there; that, provided a sufficiently large dose of hydrated peroxide of iron has been administered, no fears need be entertained of the decomposition of the sub-arsenite of iron in the stomach, even though vomiting should not have been excited, as, in proportion as the acids of the stomach decompose one portion of the compound, the arsenious acid set free is immediately neutralized, and enters into combination with another portion of the ferruginous oxide. That, in every case, therefore, the dose of the peroxide ought to be very large.

As all the peroxide of iron contains in natural combination a certain proportion of arsenic, it might easily happen, that in a case of suspected poisoning by arsenic, and where the peroxide had been administered as an antidote, this accidental occurrence might complicate the inquiry. M. Orfila with his usual ability, has, however, furnished us with the means of ascertaining on chemical analysis, what portion of the arsenic found has been derived from the poison in the stomach, and what portion from that naturally contained in the peroxide. The peroxide rejected by vomiting, or found in the stomach, is boiled in distilled water for twenty-five or thirty minutes, and if any free arsenious acid exists, it will be dissolved, and found in the aqueous fluid. If none, however, be detected, three or four drachms of the washed peroxide, with as much pure potash, must be agitated in a phial with alcohol, in the cold, for some time. This alkali, which does not act upon a single atom of the arsenic naturally contained in the iron, combines, nevertheless, with the arsenious acid of the compound which has been found in the stomach, provided it exists in any appreciable quantity. The usual tests applied to the alkaline solution will easily show whether or not any arsenic has been present. If the peroxide, however, be boiled in the alcoholic solution of potass, the whole of the arsenic which is contained in the peroxide is dissolved, both that which exists naturally in it, and that which may have resulted from the formation of a sub-arsenite in the stomach.

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*Symptoms of Poisoning produced by the Endermic application of the Acetate of Morphia.* By M. Dupont. (*Journal de la Société de Medecine de Bourdeaux,* January 1841.)—Madame C. 25 years of age, and with disease of the heart, on account of acute pain at the margin of one of the lower right ribs, had a small blister applied, and the blistered surface afterwards powdered with about four-tenths of a grain of the acetate of morphia. In about twenty minutes after the application of the morphia she complained of indistinctness of vision, which was soon followed by vomiting and delirium. She attributed those symptoms to the plaster which was spread over the morphia, and called for its instant removal, which was done. She was seen by her medical attendant a few minutes afterwards. She was vomiting every now and then whitish matters; her pulse was extremely weak, her face pale, the eyes sunk, the pupils dilated; the superior and inferior extremities in a complete state of relaxation, and she had slight delirium. Sinapisms were applied, and drinks containing vinegar and ether were administered. The vomiting still, however, continued; decoction of nut galls was therefore given every quarter of an hour, and cold gum water, but without affording any relief. Four hours elapsed, and the pulse became so feeble as scarcely to be felt; the face became covered with a slight sweat; the voice was almost lost, and the respiration stertorous and interrupted. Infusion of coffee, alternated with eau sucrée, was given, and continued for another hour without affording relief. The anti-emetic potion of Riviere was then twice given, which had the effect of stopping the vomiting. Slight incoherence continued during all the succeeding day, but by the day after no traces remained of the action of the poison.

*Twelve persons poisoned by the juice of Monkshood, Aconitum Napellus.* By M. Bolardini. (*Memoriale della Medicina Contemporanea.* September 1840.)—On the 11th of June 1840, twelve persons suffering from skin diseases or scurvy, with the view of getting rid of their complaints, swallowed each about 2 oz. 6½ drachms of the juice of monkshood, in mistake for that of scurvy-grass. An old man, about 60 years of age, was the first to suffer; his respiration became impeded, and he was seized with vomiting. A physician who was sent for mistook his complaints, and he died in a few hours. Two women, each about 55 years of age, and the subjects of scurvy, became uneasy soon after swallowing the poisonous dose; convulsions, with prostration of strength, and paralytic loss of power of the limbs, soon made their appearance, and they both died about two hours after partaking of the poison.

The other nine individuals were all violently affected, and would have fallen victims to the poison if relief had not been speedily administered.

The symptoms experienced were the following; extreme prostration of the strength of the body as well as of the powers of the mind; the countenance was very pale, and its expression much altered: the pupils of the eye were greatly dilated; the eyes had lost their lustre, and were surrounded by a bluish circle; vertigo, and headach, especially severe towards the occiput, were complained of; the abdomen was much swollen and painful: they all vomited greenish matters, and a few suffered from diarrhœa, the matters passed being of a similar colour. Feelings of oppression and great anxiety were experienced by all, together with a general sensation of cold, which increased rapidly with the poisonous symptoms; the nails were of a livid colour; cramps were complained of in the legs; and the pulse was small, feeble, and scarcely perceptible.

Emetics were first administered to excite vomiting; after which tonics and stimulants were freely given, as tincture of canella, anisette, rum, wine, &c. carried the length of producing intoxication; whilst, at the same time, the limbs were freely stimulated by frictions with spirituous lotions. Under this treatment the nine cases recovered.

The following morbid appearances presented in the three fatal cases. No change was observed to have occurred in the surface of the bodies. The vessels of the *pia mater* and arachnoid membranes were much injected with blood, and a large quantity of serous fluid was found under the arachnoid membrane, and at the base of the brain. There was, however, no effusion of blood in the ventricles of the brain. The lungs were gorged with blood; the heart was flabby, and contained black blood, and the large vessels were distended with the same. The liver and spleen were healthy. The stomach was distended with gaseous matter, and contained a quantity of viscid ash-gray coloured liquid. Irregular injected patches were observed scattered in detached points over the lining membrane of the stomach, especially towards its larger curvature. The duodenum and small intestines presented here and there red patches, and contained matters of the same colour and quality as those observed in the stomach.

## OBSTETRICS.

*Successful Case of Extirpation of the neck of the Uterus.* By M. Francesco Rizzoli of Bologna. (*Bulletino delle Scienze Mediche.* September 1840.)—A woman, 25 years of age, was admitted into the hospital at Bologna on the 17th July 1839, on account of disease of the uterus. She had been ance in the inquiry, I did not need to refer to Mr Blake's authority in proof of it; for in my experimental investigation on the Eight Pair, published in *the same number of this Journal in which Mr Blake's first memoir appeared,* I have related several experiments upon young animals, in which the carotid and basilar arteries were divided without being tied (Exper. 23 to 26,) where the respiratory movements continued after the circulation must have ceased for many minutes; and at page 285, in mentioning the results of some experiments on adult animals, I state that "I have seen the respiratory muscles twice called into simultaneous movements after all the thoracic viscera had been rapidly removed in an animal deprived of sensation and volition by a dose of prussic acid," and, it is scarcely necessary to add, for some seconds after the circulation had been suspended.

I cannot conceive what object Mr Blake had in view in making the second quotation; for my intention was not to show that "the respiratory movements still continue from one to three minutes after the circulation is arrested;" but to prove that in asphyxia, the sensorial functions are suspended at a period of the process when the venous blood is transmitted through the brain in its usual quantity.

However high an opinion I may entertain of Mr Blake's experiments upon the impediments to the passage of the blood through the capillary blood-vessels when certain poisons are thrown into the circulation, yet, as my sole object, in the particular experiments referred to, was to ascertain the condition of the capillary circulation *in asphyxia,*—a question to which Mr Blake has assuredly not even alluded,—it would have been wandering from my subject had I entered upon the consideration of these.

I entreat Mr Blake to avoid in future, for his own sake, such a display of a morbid appetite for praise; and at the same time I beg to assure him, that I have not, and never had, the slightest wish or desire to deprive him of the credit of any new facts to which he may be entitled; but he must excuse me from making digressions for the purpose of mentioning his name when I do not think this necessary for the illustration of the particular subject on which I may be engaged.

*Royal Infirmary, 25th May* 1841. JOHN REID.

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We are requested, in a note of the 28th April 1841, by the President and Secretary of the Royal College of Surgeons, London, to insert the following notice, and to solicit to it the particular attention of the Members of the Royal College.

*Royal College of Surgeons in London.*—The Council of the College, desirous of furnishing to the public a correct list of their members, request that each member will be pleased to transmit to the Secretary, between the 1st of June and 1st of July in every year by letter, a statement containing his name at full length, address and date of diploma, in his own handwriting, in order that it may be compared with the chronological list.

The Council will be further obliged by the member stating it in a similar manner when he has a degree in medicine, or the license of the Society of Apothecaries.

The Council will be glad to receive corresponding statements from the members of the Edinburgh or Dublin College of Surgeons, practising in England or Wales.

*April* 8, 1841. EDMUND BELFOUR, *Secretary.*

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# EDINBURGH
# MEDICAL AND SURGICAL JOURNAL.

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## PART I.

## ORIGINAL COMMUNICATIONS.

### ART. I.—*Antiquarian Notices of Leprosy and Leper Hospitals in Scotland and England.* Part I. By JAMES Y. SIMPSON, M. D., F. R. C. P., Professor of Midwifery in the University of Edinburgh. (Read before the Medico-Chirurgical Society of Edinburgh, 3d March 1841.)

FEW subjects in pathology are more curious, and at the same time more obscure, than the changes which, in the course of ages, have taken place in the diseases incident either to the human race at large, or to particular divisions and communities of it.

A great proportion of the maladies to which mankind are liable have, it is true, remained entirely unaltered in their character and consequences from the earliest periods of medical history down to the present day. Synocha, Gout, and Epilepsy, for instance, show the same symptoms and course now, as the writings of Hippocrates describe them to have presented to him upwards of 2000 years ago. The *generatio de novo* of a really new species of disease, "is (says Dr Mason Good[*]) perhaps as much a phenomenon as a really new species of plant or of animal." Dr Good's remark is probably too sweeping in its principle; for, if necessary, it might be easy to show that, if the particular diseases of particular animal species are liable to alteration at all, they must necessarily alter more frequently than those animal species themselves. In pursuing such an inquiry, the pathologist labours under comparative disadvantages. The physiologist can, by the aid of geological research, prove that the individual species of plants and animals inhabiting this and other regions of the earth, have again and again been changed. The pathologist has no such demonstrative data to show that, in the course of time, the forms and species of morbid action have undergone great mutations like the forms and species of normal life. But still we have strong grounds for believing that, in regard to our own individual species alone, the diseases to which mankind are subject have already undergone, in some respects, marked changes within the historic era of medicine. Since the first medical observations that are now extant on disease were made and recorded in Greece, various new species of human maladies have, there can be little doubt, made their original appearance. I need only allude to small-pox, measles, and hooping-cough. Again, some diseases which prevailed formerly, seem to have now entirely disappeared from among the human race—as, for example, the Lycanthropia of the Sacred Writings, and of Oribasius, Aetius, Marcellus, and various old medical authors.* Other maladies, as that most anomalous affection, the English sweating-sickness of the fifteenth century, have only once, and that for a very short period, been permitted to commit their ravages upon mankind. And lastly, we have still another and more extensive class, including maladies that have changed their geographical stations to such an extent, as to have made inroads upon whole districts and regions of the world, where they were formerly unknown, leaving now untouched the localities, which, in older times, suffered most severely from their visitations.

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[*] Study of Medicine, Vol. i. Pref. p. xxiii.

Among this last tribe of diseases no one presents a more curious subject of inquiry than the European leprosy, or tubercular elephantiasis of the middle ages. This malady is now almost entirely, if not entirely unknown as a native endemic disease on any part of the continent of Europe; and yet from the tenth to the sixteenth century it prevailed in nearly every district of it. Laws were enacted by Princes and Courts to arrest its diffusion;—the Pope issued bulls with regard to the ecclesiastical separation and rights of the infected;†—a particular order of Knighthood was instituted to watch over the sick;—and leper hospitals or lazar-houses were everywhere instituted to receive the victims of the disease. The number of these houses has certainly been often erroneously stated, in consequence, as far as I have been able to trace it, of a strange mistake committed by Ducange, in quoting from Matthew Paris a passage in which that historian contrasts the respective possessions belonging in the thirteenth century to the Hospitalarii, Knights Hospitallers, or Knights of St John, as they were termed, and the Knights Templars. The 19,000 lazar-houses in Christendom, as interpreted by Ducange, mark in Matthew Paris's work merely the number of manors or commanderies of the Hospitalarii, and have no reference whatever to leprosy or lazar-houses.[*] But still that an immense number of leper houses existed on the continent at the period mentioned, is abundantly shown in many of the historical documents of that age. Louis VIII. promulgated a code of laws in 1226, for the regulation of the French leper hospitals; and these hospitals were at that date computed to amount, in the then limited kingdom of France, to not less than 2000 in number—(*deux mille leproseries.*)[†] They afterwards, as is alleged by Velley,[‡] even increased in number, so much so, that there was scarcely a town or burgh in the country that was not provided with a leper hospital. In his history of the reign of Philip II. Mezeray uses the same language in regard to the prevalence of leprosy and leprous patients in France during the twelfth century.[§] Muratori gives a nearly similar account of the extent of the disease during the middle ages in Italy;[||] and the inhabitants of the kingdoms of Northern Europe, equally became its unfortunate victims.[¶]

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* See some learned notices regarding this strange species of mania (the wolf-madness or wehrwolf of the Germans) in Burton's Anatomy of Melancholy (edit. of 1804), Vol. i. p. 13, and Heinrich Hase's late work on the Public and Private Life of the Ancient Greeks, p. 17. Ploucquet, in his Literatura Medica, gives references to a number of articles and monographs on the subject under the word *Lycanthropia*, Vol. i. p. 510.

† See particularly the Canon De Leprosis of Pope Alexander III. in the Monasticon Anglicanum, Tom, ii. p. 365; and Semler's Historiæ Ecclesiasticae Selecta Capita, Tom. iii. p. 170.

I have no desire, however, to enter at present into the extensive history of the leprosy of the middle ages, as seen in the different quarters of Europe. My object is a much more limited and a much more humble one. I wish only to adduce various evidence to show that the disease extended to this the most western verge of Europe, and at one time prevailed to a considerable extent in our own kingdom of Scotland, which, at the period alluded to, was one of the most remote and thinly populated principalities in Christendom. I shall have frequent occasion, at the same time, to illustrate my remarks by references to the disease as it existed contemporaneously in England.[*]

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[*] The terms employed by Matthew Paris are quite precise. "Habent insuper *Templarii* in Christianitate novem millia Maneriorum; *Hospitalarii* vero novemdecim." Angli Historia Major (Ed. of 1644) p. 417. In referring to the subject under the word Leprosaria, Ducange states, "Dominus Matthæus Paris, Hist. Angl. p. 63, affirmat suo tempore fuisse Leprosarias 1900 (19000 ?) in toto orbe Christiano." See his Glossarium, Med. et Inf. Latinitatis, Tom. iv. p. 126. At p. 63 of the Appendix to Paris, the institution of one hospital at St Alban's is referred to; but neither here nor elsewhere in his work can I find any allusion whatever to the existing number of leper hospitals in England, or in Christendom in general.

[†] Velley, Villaret et Garnier, Histoire de France, Tom. ii. (Ed. of 1770) p. 291.

[‡] Velley, &c. Histoire, ii. p. 292.

[§] Mezeray, Histoire de France, Tom. ii. 1645, p. 168. "Il n'y avoit ny ville, ny bourgade, qui ne fust obligée de bâtir un hospital pour les (Lepres) retirer."

[||] Antiquitates Italicæ Medii Aevi, Tom. iii. p. 53. "In Italia vix ulla erat civitas quae non aliquem locum, Leprosis destinatum, haberet."

[¶] Acta Sanctorum a Patribus Soc. Jesu Antuerpiæ Collecta. Holst in his Work on Radesyge, (Morbus quem Radesyge vocant. Christianae, 1817,) refers to the works of Smid and Petersen, as showing that Denmark formerly suffered much from leprous diseases, (morbis Leprosis olim graviter vexatam fuisse,) p. 90.

In following out the object adverted to, I shall commence by an enumeration of such leper hospitals as I have detected any notices of in old Scottish records. The knowledge of the mere existence of most of these hospitals has been obtained more by the accidental preservation of charters of casual grants to them, than by any historical or traditional notice of the institutions themselves. The information, therefore, which I have to offer in regard to most of them is exceedingly slight. The following meagre notes regarding the two first Lazar or Leper-houses, Spitals, Spetels, or Spitles,[†] which I shall mention, show the truth of this remark.

## Scottish Leper Hospitals.

*Aldcambus, Berwickshire.*—A Leper Hospital existed at Aldcambus, in the parish of Cockburnspath, Berwickshire, as far back as the reign of William the Lion.

In the Cartulary of the Priory of Coldingham is preserved a charter by which that monarch confirms a grant of half a carrucate of land to this hospital. I shall give a transcript of the charter, which has hitherto remained unpublished. I do so that it may serve as a fair specimen of the various similar charter documents to which I shall have occasion to allude in the course of the following remarks. It is entitled "Confirmatio donationis Hospitali de Aldcambus facta:"—"Willelmus Dei gratia Rex Scottorum omnibus probis hominibus totius terre sue Clericis et laicis salutem. Sciant presentes et futuri me concessisse, et hac cartâ meâ confirmasse donationem illam, quam David de Quicheswde fecit Hospitali de Aldcambus et Leprosis ibi manentibus, de illa dimidia carucata terræ in Aldcambus quam Radulfus Pelliparius tenuit tenendam: in liberam et puram et perpetuam eleemosinam, cum omnibus libertatibus et aisiamentis ad predictam terram juste pertinentibus, ita liberé et quieté sicut carta predicti Davidis testatur Salvo servicio meo. Testibus Willelmo de Bosch, Cancellario meo, Waltero Cuming, Davide de Hastings. Appud Jeddewrith, xvi. die Maij."[‡]

*Aldnestun in Lauderdale.*—At Aldneston another leper-house existed. It was under the control of the Abbey of Melrose. In the Melrose Chartulary there is preserved a charter headed "Carta Leprosorum de Moricestun." In this charter, Walter Fitzallan, Steward of Scotland, granted to this hospital of Auldnestun and its inmates, (Hospitali de Auldnestun et infirmis fratribus ibidem residentibus,) a carrucate and a-half of land in the village of Auldnestun; another carrucate and a-half, which Dame Emma of Ednahim held, (tenuit per suas rectas divisas,) with the common pasturage and easement (asiamento) of the forests of Birkenside and Ligarrdewude, (Legerwood), and a right to grind at his mill without paying multure.[*]

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[*] For reference to the prevalence of Leprosy and Leper hospitals in Ireland, see Ledwich's Antiquities of Ireland, (Dublin, 1804,) p. 370.

[†] Terms manifestly, (according to Junius, Johnson, Richardson, &c.) mere corruptions of the word hospital.

[‡] Manuscript Cartulary of the Priory of Coldingham, p. 25. Advocates' Library, Edinburgh. In the above Latin extract the original orthography is preserved.

*Kingcase, Ayrshire.*—At Kilcais or Kingcase, on a bleak muir in the parish of Prestwick, and about two miles from the town of Ayr, stood, for several centuries, an hospital for Lepers. The general tradition of the surrounding country avers that this hospital was founded by King Robert the Bruce. In the article on Ayr, recently published by the Rev. Dr Auld and Mr Cuthill, in the New Statistical Account of Scotland,[†] the foundation charter of Robert Bruce is said to have been purchased by the Magistrates of that town in 1786. I am obligingly assured, however, by Mr Murdoch of Ayr, that no such document is known to exist among the archives of that town. It is probable that the hospital existed before the time of Bruce. In a charter to the monastery of Dalmulin, contained in the cartulary of Paisley Abbey,[‡] and of the date of the reign of William I. of Scotland, among other lands and localities in Kyle and the immediate neighbourhood of Kingcase, the term Spetel-Crag occurs. Now the term Spetel was a prefix applied, both in Scotland and England, to all hospital lands and possessions, and to these alone; and history records no other hospital whatever in Kyle, from which this appellation of Spetel Craigs could be derived. But whether Bruce was the original founder, or, what is more probable, a liberal endower of the hospital, we know this at least of the history of the Kingcase Leper Hospital, that it possessed at one time pretty extensive lands and property in the parish of Dundonald, and in Kyle Stewart.[§]

These, like many other hospital grants, came after a time to be perverted from their original objects of charity, and applied to the aggrandizement of particular individuals. Thus the family of Wallace of Newton obtained from James II., a feu-charter of the Kingcase estate of Spittalshiels, for the annual payment of eight merks Scots, and sixteen thrave of straw. In reference to this the land of Spittalshiels has yet (observes Sir Walter Scott in a note to his Lord of the Isles,[‖] ) to give if required, a quantity of straw for the lepers' beds of Kingcase, and so much to thatch their houses. Along with Spittalshiels the Wallaces acquired the office of Hereditary Keeper or Governor of the Hospital itself, and of the other lands pertaining to it. In the family of the Wallaces of Craigy this right of patronage and presentation to Kingcase was long held, with all the remaining endowments of the hospital. These privileges were exposed at a judicial sale of the estate of Craigy, and purchased, 1784, by the burgh of Ayr, for L.300. The magistrates from this right exact feu-duties from the lands formerly belonging to Kingcase, to the annual extent of sixty-four bolls oatmeal, and eight merks Scots money. This revenue has been made over to the poor's house of Ayr. In virtue of it the magistrates have the privilege of presenting a certain number of inmates to this latter institution.[*]

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[*] Liber de Sanctæ Mariæ de Melros. Presented by the Duke of Buccleuch to the Bannatyne Club, Edinb. 1839, Tom. i. p. 70.—See also Morton's Monastic Annals of Teviotdale, 1832, p. 265.

[†] Stat. Ac. of Scotland, No. xvi. p. 75.

[‡] Registrum Monasterii de Passelet, 1163–1529. Presented by the Earl of Glasgow to the Maitland Club, Tom. i. p. 21.—I am indebted to Mr E. Thomson of Edinburgh, and formerly of Ayr, for pointing out to me the fact and inference in the text.

[§] See Chalmers's Caledonia, Vol. iii. p. 496, and Records of the Burgh of Prestwick, from the fifteenth to the eighteenth century. Glasgow, 1834, p. 127.

[‖] The Lord of the Isles, Canto v. Note vii.

No records remain as to the original extent of the Kilcais Hospital. The number of lepers supported was, during the latter years of the institution, limited to eight. Before the hospital revenues and lands were despoiled the number might have been greater. The only remnants of the buildings which are now left consist of the massive side wall of a house 36 feet long and 17 wide. This is generally alleged to be the ruins of the chapel merely of the hospital; and under this view it is certainly calculated to give us a high opinion of the ancient extent and endowments of the institution. Sir Robert Gordon, in a description of Kyle, published in 1654 in Bleau's Atlas, states that the persons admitted to the charity were then lodged in huts *(tuguria)*, in the vicinity of the chapel.[†]

*Glasgow.*—In 1350, in the reign of David II., the Lady of Lochow, daughter of Robert Duke of Albany, erected a leper hospital at the Gorbals of Glasgow, near the old Bridge.[‡] She endowed this hospital with some lands and houses in the city. The magistrates of Glasgow seem to have exercised the privilege both of searching for Lepers among the inhabitants, and of consigning them to this hospital. From the Burgh Records presented some time ago by Mr Smith to the Maitland Club, it appears that, in 1573, the magistrates ordained four persons named as Lepers "to be viseit, (inspected), and gif they be fund so, to be secludit of the town to the Hospital at the Brigend."[§] A similar edict was issued in regard to two other individuals in 1575[||] and in 1581, eight more seem to have been dealt with in the same manner.[¶] The Bishops of Glasgow appear also to have had a right to present patients to the hospital. In 1464, Andrew Muirhead, who then held the bishoprick, availed himself of the privilege by presenting one patient.

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[*] Session Papers, Advocates' Library, Vol. xxix. Petition of Colonel Fullarton to the Lords of Council and Session, Jan. 18, 1798, for the patronage, &c. of Kingcase.

[†] Geographiae Bleauvianae, Vol. vi. p. 60.

[‡] Gibson's History of Glasgow, (1778,) p. 52. Cleland's Glasgow, 1816, Vol. i. 68.

[§] Burgh Records of Glasgow, from 1573 to 1581, (printed 1832), p. 1.

[||] Ibid. p. 52.

[¶] Ibid. p. 127.

On the 9th August 1589, a report was given in to the magistrates of Glasgow, stating that six lepers were at that time in the house.* As late as 1664, the ground-rents of this hospital were uplifted by the water-bailie, an official who, according to an entry in the city records of Glasgow, was in the custom of giving in annually the number of lepers in the hospital at the Brigend. This hospital, like that of Kingcase, was dedicated to the Gallovidian Saint, St Ninian.

*Edinburgh.*—A leper hospital formerly existed at Greenside, which was then a suburb, and not, as now, a constituent part of the city of Edinburgh. The history of the hospital and its laws are preserved in the Town-Council records. In 1584, the city Magistrates issued orders for finding a commodious place for a leper-house.† In 1589, they passed an act for building such an institution at Greenside, and apparently with money granted to them for that purpose, by John Robertson, a merchant in Edinburgh, and others, in pursuance of some previous vow.‡ On the 23d November 1591, five leper inhabitants of the city were consigned to this hospital.§ Two of the wives of the lepers voluntarily shut themselves up in the hospital along with their diseased husbands. I shall afterwards recur to the strict laws which the inmates were bound to observe. In a charter of rights given to the city in 1636 by Charles I. there are enumerated among the other grants which he confirms to them, " the lands of old called the Greenside, with the Leper-house and yard situate on the same, arable lands, banks, and marishes thereof, for the present occupied by the Lepers of the said house." ‖ The hospital, however, does not appear to have been of long duration. In 1652, the magistrates ordered that the roof of the Leper-house be taken off, and its wood, slates, &c. used to repair the town milns and other public buildings; ¶ and in 1657, a similar appropriation was made of the stones contained in the walls of the leper-house, and in the fence around its yard or garden.**

*Aberdeen.*—In an old manuscript " Description of bothe Touns of Aberdeen," by James Gordon, as quoted in the entertaining " Book of Bon Accord," the following notice of a leper hospital at Aberdeen occurs,[*] "Such as go out at the Gallowgate port towards Old Aberdeen, haff way almost, may see the place where of old stood the lepers' hospital, called the seick-house, hard by the way syde. To which there was a chappell adjoyned, dedicated to St Anna, quhome the Papists account patronesse of the lepers. The citizens licencit one Mr Alexander Galloway, the person of Kinkell, for to build that chappell anno 1519. Now both these buildings are gone, and scarcely is the name knowne to many." "On the 18th August 1574, the Regent Morton, and the Lords of the Privy-Council commanded the Magistrates of Aberdeen to uptake fra James Leslie, present possessioure of the croft and myre pertening to the Lipperfolk, the yeirle dewtie tharof off the five yeiris bypast; and thairvith, and sic vthir collectioune as may be hade, to caus the said house be theikkit (thatched, roofed) and reparit for the resett of the said Lipperfolk in tym cuming: And to caus roup the said croft and myre, to quha vill giff maist yeirle dewtie tharfor fra thre yeir to thre yeir: And to caus the haill proffeit to be employit vpon the upolding of the said hous, and sustentation of the Lipper folks that salbe tharin.[†]

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* Memorabilia of Glasgow, selected from the Minute Books of the Burgh, 1588 to 1750, (printed 1835,) p. 55.

† Manuscript Records of the Town-Council of Edinburgh, Vol. vii. p. 168. There would seem to have been a Leper hospital belonging to Edinburgh antecedent to that built at Greenside. At least in the City Council Records for 30th September 1584, I find a missive for Michael Chisholm and others, to inquire into " the estait and ordour of the *awld* (old) fundatioun of the Lipper-hous besyde Dyngwall." The Castle of Dyngwall, the residence of the provost of the adjoining Trinity College, formerly stood on the site of the Orphan Hospital behind Shakespeare Square.

‡ Manuscript Records of the Town-Council, Vol. ix. p. 9 and 12.

§ Ibid. Vol. ix. p. 123.

‖ Pennecuik's Historical Account of the Blue Blanket or Craftsmen's Banner. Edinburgh, 1722, p. 135.

¶ Manuscript Records, Vol. xvii. p. 298. ** Ibid. Vol. xix. p. 210.

In the beginning of the eighteenth century, the hospital and grounds were sold under the direction of the magistrates, and the money received appropriated to the establishment of a fund for a proposed lunatic asylum. The leper croft now belongs to King's College.[‡]

*Rothfan, Elgin.*—A leper-house seems to have existed from an early period at Rothfan, near Elgin. John Byseth made a gift to this hospital at Rothfan of the Church of Kyltalargyn, for the avowed purpose of maintaining seven lepers, a servant and chaplain. The donor retained to himself and his successors, the privilege of preserving the number complete, by filling up the vacancies. On his request and presentation, William, prior of the hospital, was admitted to the church in 1226.[§]

The precise date of Byseth's charters is not preserved, but they seem to have been drawn out during the reign of Alexander II. or III. From their phraseology the hospital evidently was in existence previous to that time.

The lands pertaining to this hospital are still known under the name of the Leper Lands,[||] though the institution itself has been long obsolete.

*Shetland.*—Lastly, we have records of several small and temporary lazar houses in Shetland. Thus, long ago, Brand (the honest missionary, as Hibbert terms him,) states that in that country the " scurvy sometimes degenerates into leprosy, and is discerned by hairs falling from the eyebrows, the nose falling in, &c. which," (he adds,) " when the people come to know, they separate and set them apart for fear of infection, building huts or little houses for them in the field. I saw the ruines of one of these houses about half a mile from Lerwick, where a woman was for some years kept for this reason. These scorbutick persons are more ordinarily in Dunrossness and Delton, and more rare in other places.'*

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[*] Book of Bon Accord 1839, p. 341.

[†] Ibid, p. 312.

[‡] Kennedy's Annals of Aberdeen, Vol. ii. p. 82, and Vol. i. p. 168.

[§] Registrum Episcopatus Moraviensis, Edinb. 1837 p. 77-78. Sir John G. Dalyell's Brief Analysis of the Records of the Bishopric of Moray, Edinb. 1826—p. 34

[||] Rhind's Sketches of Moray, (1840), p. 114.

" Formerly," (says Dr Edmonstone, another and more recent author on the Shetlands,) " when leprosy was very prevalent, the unfortunate individuals who were seized with it were removed to small huts erected for the purpose, and there received a scanty allowance of provisions daily, until the disease put a period to their miserable existence.†

## NUMBER OF HOSPITALS, AND EXTENT OF THE DISEASE.

The Scottish lazar-houses that I have thus enumerated, though few in number, are still sufficient to show that the disease for which they were instituted was generally diffused over the extent of the kingdom. Thus, we have found the establishments in question, spread from Berwickshire to Shetland, and from Aberdeen to Ayr. More research than I have been able to bestow upon the matter would no doubt bring to light notices of various additional hospitals. In some Scottish towns names and notices still exist, sufficient to lead to the probability of lazar-houses having formerly existed in them, though that evidence is in other respects altogether incomplete.

In the immediate neighbourhood of Edinburgh a Leper station probably existed at a date greatly earlier than that of the Greenside Hospital. In his Caledonia,‡ the late excellent antiquary and philologist, George Chalmers, expresses his belief in the opinion suggested by the Rev. Mr White, that the name of the village of Liberton (two miles south of Edinburgh) is merely a corruption of Liper town,—Liper being the old Scotch term for Leprosy; and, as is well known, the letters *p* and *b* being constantly interchanged for one another in the composition and transmutation of words. This idea is certainly in no small degree countenanced by the circumstance that the lands of Upper Liberton (Libertune) in some old writs are described under the name of " terrarum de Spittle town," (Hospital town.)§

Besides, the " Oily or Balm Well of St Catherines at Liberton" had been long held in high estimation in curing cutaneous diseases, and still maintained great repute as late as the sixteenth and seventeenth centuries. In his brief but interesting " Cosmography and Description of Albion," Boece, Canon of Aberdeen at the commencement of the sixteenth century, states that the oil of this well "valet contra varias cutis scabricies."—Historiæ Scotorum, (1526), p. xi.*

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* A Brief Description of Orkney, Zetland, Pightland Frith, &c. Edinb. 1701, p. 72.

† View of the ancient and present state of the Zetland Islands, Vol. ii. p. 103. Edinb. 1809.

‡ Vol. ii. p. 7, 88.

§ See Transactions of the Society of the Antiquaries of Scotland, Vol. i. p. 295.

J. Monipeny alleges that its oil or " fatness is of a sudain operation to heal all salt scabs and humors that trouble the outward skin of man."† Dr Hare makes mention of it to the same purpose.‡ After the institution of the monastery of St Catherine of Sienna (*Scotticé* Sheens) on the Burrow Moor, at a short distance south of the city walls of Edinburgh, the Dominican nuns belonging to it made, in honour of St Catherine, an annual solemn procession to the Chapel and Balm Well of Liberton.§

This " oily or balm well" of Liberton was sufficient to excite the admiration and engage the protective care of the credulous King James VI. In a curious monograph,|| on the virtues of the well, published at Edinburgh in 1664, the author, " Mathew Mackaile, Chirurgo-Medicine," indulges himself (p. 117) in the following historical eulogium and anathema in regard to it.

" His Majesty King James the Sixth, the first monarch of Great Britain, of blessed memory, had such a great estimation of this rare well, that when he returned from England, to visit this his ancient kingdom of Scotland in anno 1617, he went in person to see it, and ordered, that it should be built with stones from the bottom to the top, and that a door and a pair of stairs should be made for it, that men might have the more easie access unto its bottom, for getting of the oyl. This royal command being obeyed, the Well was adorned and preserved, until the year 1650, when that execrable regicide and usurper, Oliver Cromwell, with his rebellious and sacrilegious accomplices, did invade this kingdom, and not only deface such rare and ancient monuments of Nature's handwork, but also the synagogues of the God of Nature."

But it is unnecessary to insist further upon such problematical evidence, in regard to the probable extent and prevalence of the

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* Boece gives with great gravity the following extravagant account of the holy origin of the oily well of Liberton. " Nocht two milis fra Edinburgh (says he) is ane fontane dedicat to Sanct Katrine, quhair sternis of oulie springis ithandlie (where drops of oil rise constantly) with sic abondance, that howbeit the samin be gaderit away, it springis incontinent with gret aboundance. This fontane rais throw ane drop of Sanct Katrinis oulie, quhilk was brocht out of Mount Sinai, fra hir sepulture, to Sanct Margaret, the blessit Queene of Scotland; and als sone (as soon) as Sanct Margaret saw the oil spring ithandlie, be divine miracle, in the said place, she gart big ane chappell (made be built a chapel) there, in the honour of Sanct Katherine."—Bellenden's translation of Boece's Hystory and Chroniklis of Scotland, p. xxxviii.

† Memorial of the rare and wonderful things in Scotland, at the end of his Abridgement of the Scotch Chronicles London, 1612.

‡ Dyet of the Diseased. Book iii. Cap. 19.

§ Trans. of the Society of Antiquaries, Vol. i. p. 324.

|| The Oily Well, or a Topographico-Spagyrical Description of the Oily Well at St Catherine's Chappel, in the Paroch of Liberton. Edinburgh, 1664.

disease in Scotland. A proof of this, of a much stronger character, is afforded by the simple fact, that, as late as the reign of James I. the victims of the disease were made the subject of a direct and special legislative enactment in the Scottish Parliament, held at Perth in the year 1427. I shall quote one short clause from this act " anent Lipper Folke,"[*] (as it is termed), to illustrate both the apparent prevalence of the malady at that time, and this circumstance, that the burghs of the kingdom are then spoken of, as possessing, or obliged to possess, lazar-houses of their own. The second clause is to the following effect: " Item, that na Lipper Folke sit to thig (beg) neither in kirk nor kirkzaird, nor other place within the burrowes, but at their own hospital, and at the port of the towne and other places outwith the burrowes."

It is impossible to form any approach as to the number affected in this country. The hospitals that I have enumerated do not seem calculated to contain many patients. As we have already seen that of Ayr contained, at least, eight patients ; Rothfaun, seven ; five were admitted into the Greenside hospital at its first opening in 1591 ; and in a report of the Glasgow hospital, submitted to the magistrates in 1589, six lepers were reported as then belonging to that institution. These data are entirely inadequate to draw any conclusion from, and the more so, that here, as in England, the disease was probably more extensively spread during the eleventh, twelfth, and thirteenth centuries than afterwards; and it is exactly at that remote period that all our Scottish records are most defective.

In these early times, the very words employed to designate the disease show its extent and severity. Somner, Lye, and Bosworth, in their several Dictionaries of the old Anglo-Saxon language, all quote the remarkable expression, " *seo mycle adl*," " the mickle ail" or great disease, as signifying " elephantiasis" or " leprosie ;" and it is worthy of observation, in reference to the same point, that the delightful old French chronicler, Sir John Froissart, who visited Scotland in the time of Robert II., applies, as we shall afterwards see, the analogous term of " la grosse maladie" to one noted case of leprosy in this country. Some further idea may be formed of the frequency of the disease, at least, in the border counties of Scotland, when I state, that, before the year 1200, there existed various hospitals for the exclusive reception of lepers in the immediately adjoining English counties of Northumberland, Cumberland, and Durham. Three alone of these hospitals contained as many as ninety-one lepers in all, viz. the hospital of Sherburne, near Durham,[†] contained sixty-five ; St Nicholas, Carlisle,[‡] contained thirteen ; and Bolton, in Northumberland, founded, as its charter[*] bears, by Robert de Roos, " pro salute animae meae et omnium antecessorum et successorum meorum," was endowed for other thirteen.

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[*] Sir Thomas Murray's edition of the Acts of Parliament made by James the First, &c. (Edinburgh, 1681.) p. 18, or T. Thomson's edition of the Acts of the Parliaments of Scotland, (1814), Vol. ii. p. 16.

[†] Surtee's Antiquities of the County Palatine of Durham, Vol. i. p. 127.

[‡] Nicolson and Burn's History of Westmoreland and Cumberland, Vol. ii. p. 250.

I may here take the opportunity of stating that the labours of different English antiquaries, and more particularly the investigations of Leland, Dugdale, and Tanner into the Monastic History of England, tend to show that, at an early period, many leper houses were scattered over England and Wales. In searching through the works of these authors, and more particularly through the late splendid edition of the Monasticon Anglicanum, with the numerous additions of Caley, Ellis, and Bandinel, I have found references to between eighty and ninety English lazar-houses.[†]

In the second and third volumes of the Monasticon Anglicanum (1st edit.) above ninety[‡] charters or other notices of English hospitals are published, and of these twenty-one at least were hospitals for the reception of Lepers. Bloomefield[§] mentions eighteen leper houses in Norfolk alone; and Taylor,[||] in his Index Monasticus, enumerates twenty in that single county. Six of these were placed in Norwich or its immediate vicinity, and five at Lynne Regis.

## Objects, Character, and Government of the Leper Hospitals.

The leper hospitals, both in Scotland and elsewhere, were intended merely as receptacles to seclude the infected, not as houses in which a cure of them was to be attempted. They were charitable and hygienic rather than medical institutions.

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[*] Dugdale's Monasticon Anglicanum, Tom. ii. p. 458. Tanner's Notitia Monastica, (fol. edit.) p. 395.

[†] It may be proper to state, that the references made to the Monasticon Anglicanum throughout the present paper, apply always to the first edition of that great work, unless when it is otherwise specified.

[‡] In the index to Tanner's Notitia Monastica, (Nasmith's folio edition), 509, hospitals, leper-houses, and Maisons Dieu, are referred to as having existed in England previously to the act for their suppression by Henry VIII. (See a table in Taylor's Index Monasticus, p. xxv.) We have no collection of data on which to form any similar general calculation for Scotland. In Chalmers's Caledonia (Vol. ii. p. 347,) nine hospitals are stated to have existed in the county of Berwick alone. In the Scottish Parliament of 1424, an act was passed regarding the hospitals " uphaldane to pure folks and seik (poor people and sick") throughout the kingdom, and empowering the chancellor and bishops to " reduce and reforme tham to the effec of thair first fundacione." (See Thomson's edit. of the Scotch Acts of Parl. Vol. ii. p. 7.) Some of the hospitals in these early times were founded for the reception of the sick and infirm; others for lepers; many for the poor and aged; and a considerable number for the gratuitous entertainment of pilgrims and travellers. Among the whole long English list I have only found four endowed as lunatic asylums. A few were instituted for purposes which sound strangely in the ears of the present generation. Thus the hospital of Flixton or Carman's Spittle in the parish of Folketon, Yorkshire, was founded in the time of King Athelstane, to preserve travellers from being devoured by the wolves and other voracious and forest beasts of the districts, (" pro conservatione populi inde transeuntis, ne populus ille per lupos et alias bestias voraces et sylvestres, inibi existentes, devoretur.") See the renewed charter of Henry VI. in the Monasticon Anglicanum, Tom. ii. p. 372.

[§] Bloomefield's History of Norfolk continued by Parkin.

[||] Taylor's Index Monasticus to the Diocese of Norwich, p. 52, seq.

At the present day tubercular leprosy is still regarded as a disease which sets at defiance all the powers of the medical art. Our ancestors had so firm a belief in the same doctrine, that in the case of one of the unfortunate wretches who was tried in Edinburgh in 1597, for witchcraft, amongst the gravest of the accusations brought against the panel was this, that she, (Christian Livingstone,) "affirmit that she culd haill (cure) leprosie, quhilk (the libel adds) the maist expert men in medicine are not abil to do." Some of the means of cure she had employed have never, I am afraid, been allowed a place in any of our pharmacopœias. I may allude therefore as a specimen to one of them amongst others, viz. (and I quote the words of the libel) "she took a reid cock, slew it, baked a bannock (cake) with the blude of it, and gaf (gave) the samyn to the Leper to eat."*

I leave it to the dogmatism of the pharmacologists to decide whether more potent virtues should be ascribed to this recipe of Christian Livingstone's, or to that deliberately offered with the same purport by our celebrated countryman Michael Scott. "It ought to be known (says the great Fifeshire philosopher) that the blood of dogs and of infants two years old or under, when diffused through a bath of heated water, dispels the Leprosy without a doubt, (*absque dubio liberat Lepram.*)"†

The miraculous properties of the relics of saints were in some instances strongly relied upon as an article of the Materia Medica, fit among other things to cure this incurable malady. Fosbroke‡ mentions a fountain near Moissac, described by Payrat, (abbot of that place, in the fourteenth century,) the waters of which were so medicated by the relics of a saint contained in the neighbouring abbey, that the crowds of Lepers who resorted to it bathed and were immediately cured. But the valued fountain was not sufficiently powerful to avert the disease being communicated to the monks, or to save them even when once they were contaminated; and at last, according to the confessions of the abbot, it was shut up in consequence of some of the order dying of the very malady which their famed waters could infallibly remove.

In the sequel, when considering the causes of the disease, and the regulations of medical police, adopted in regard to the infected, I shall have occasion to speak at length of the strict rules to which the inmates of most of the leper hospitals were subjected —not for the sake of medical treatment, but with the purpose only of preventing the dissemination of the malady.

Besides being places for the isolation of the infected, the leper hospitals of Scotland and England were often, like the corresponding institutions of the continent of Europe, founded and endowed as religious establishments; and as such, they were generally submitted to the sway of some neighbouring abbey or monastery. Semler* quotes, indeed, a Papal bull, appointing every Leper house to be provided with its own churchyard,† chapel and ecclesiastics,—(cum cimiterio ecclesiam construere, et proprio gaudere presbyterio), an order against the latter part of which the poverty of many of the hospitals in Great Britain formed a very secure guarantee. The Greenside Hospital in Edinburgh, being founded at a very late period, partook, perhaps, less of the character of a religious establishment than most others in the kingdom.

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* Pitcairn's Criminal Trials in Scotland, Vol. ii. p. 29.

† De Secretis Naturae, (Amsterdam ed. of 1790) p. 241.

‡ British Monachism, or Manners, &c. of the Monks of England, p. xv.

The rules established for the domestic and religious duties of the inmates belonging to it, by the commissioners appointed by the magistrates of the city, were few and simple, viz :

" That the said persons, and ilk ane (every one) of thame leif (live) quetlie, and gif (give) na sclander, be banning, sweyring, flyting, skalding, filthie speaking, or vitious leving, or any oyder way, under the paynes to be enjoynit by the counsall."

" That thair be appoyntit ane ordinair reider to reid the prayeris evrie Sabboth to the said lepperis, and ane commodious place appoyntit to the said reider for that effect."‡

Over some of our Scotch-lazar houses, chaplains, and religious officers, with the high-church title of Priors, were placed.

The Prior of Rothfan Hospital was, at the intercession of the founder of the house, admitted to the church. There was one chaplain under him.

In the records of the burgh of Prestwick there is an incidental entry, showing that there was a Prior placed over the Kingcase Hospital near Ayr in 1507, for " George Yong, Prior of Kingiscase, accusyt Thome Greif of four barrels of beyr, and the said Thomas grantyt 24 shillings, but denyit ye beer."§ We have already seen that there were chapels annexed to the Kingcase and Aberdeen Hospitals. Our history of the other lazar houses in Scotland is so imperfect as not to enable us to state whether they were equally well provided; but certainly many of the richer leper and other hospitals in England had, as appears from their better preserved records, free chapels attached to them, with resident regular or secular canons. In the Sherburne Leper Hospital, near Durham, there were, besides the Prior, four priests and four attendant clerks.‖ The hospital of St Giles, Norwich, was provided with a master or Prior, and an establishment of eight regular canons acting as chaplains, two clerks, seven choristers, and two sisters; while the only permanent residents to whose wants they were required to minister were eight poor bed-ridden subjects !¶

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* Historiae Ecclesiasticae Selecta Capita, Tom. iii. p. 170.

† On the north-west side of the ruins of the Kingcase Hospital Chapel, Ayr, the burial place of the Leper bedesmen is still pointed out, but the numerous and marked " undulations of the green sward " are their only tombstone.

‡ MS. Records of the Town Council of Edinburgh, Vol. ix. p. 123.

§ Ancient Records of the Burgh of Prestwick, Glasgow, 1834, p. 40.

‖ Surtee's Durham, Vol. i. 128.

¶ Index Monast. p. 55.

Both the ecclesiastical officers of the leper hospitals, and the leprous inmates themselves, were in general strictly enjoined, by the foundation charters and regulations of their institutions, to observe strict religious formulæ, and especially to offer up prayers for the souls of the founder and his family. That the duties connected with this last office were in some instances by no means slight, will be sufficiently apparent by the following extract from the laws of the leper hospital at Illeford, in Essex, which I translate from the regulations established for the house in 1346 by Baldok, Bishop of London.*

"We also command, that the Lepers omit not attendance at their church, to hear divine service, unless prevented by grievous bodily infirmity: they are to preserve silence there, and hear matins and mass throughout, if they are able; and whilst there, to be intent on prayer and devotion, as far as their infirmity permits them. We desire also and command that, as it was ordained of old in the said hospital, every leprous brother, shall, every day, say, for the morning duty, a Pater noster and Ave Maria, thirteen times; and for the other hours of the day respectively, namely, the first, third, sixth hour of the vespers, and again at the hour of the concluding service, a Pater noster and Ave Maria seven times; and besides the aforesaid prayers, each leprous brother shall say a Pater and Ave thirty times every day for the founders of the hospital and the bishop of the place, and all his benefactors and all other true believers, living or dead; and on the day on which any one of their number departs from this life, let each leprous brother say in addition, fifty Paters and Aves, three times, for the soul of the departed and the souls of all deceased believers. But if any one shall openly (*manifesto*) transgress the said rules, or any one of them, for each trangression let him receive a condign punishment according to the amount of the offence, from the Master of the said hospital, who is otherwise called the Prior. But if a leprous brother secretly (*occultè*) fails in the performance of these articles, let him consult the priest of the said hospital in the Penitential Court."

In several of the hospitals the passions of the inmates were endeavoured to be restrained by the laws laid down by their Superior. Thus the articles of the leper-house of St Julian, at St Albans, contain the following significant regulations of Abbot Michael *de accessu Mulierum.* "And since by the access of women, scandal and evils of no slight nature arise, we above all things forbid that any woman enter the hospital of the brothers, with the exception of the common laundress of the house, who must be of mature age and discreet manner of life, (maturae aetatis et bonae conversationis), so that no suspicion can attach to her. And she must not presume to enter the house at suspicious times, but at the proper hours, so that her entrance and exit may be seen by all. But if a mother or sister, or any other honest matron, come there for the purpose of visiting the infirm, she may have access to the one with whom she wishes to speak, and this may be done by the permission of the custos; without which they are not to enter, whatever may be their rank. But women of light fame and evil reputation are by no means to enter the houses."*

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* Monasticon Anglicanum, Tom. ii. p. 390.

The Custos, Master, Dean or Prior, and in some houses, the Prioress,† seems in general to have had full control over the leprous inmates of the hospital. Thus in the laws which have been transmitted to us of the Sherburne Hospital, it is laid down that members were to be punished for disobedience or idleness, at the discretion of the prior, by corporeal correction with the birch, "*modo scholarium.*" Offenders who refused to submit to this chastisement had their diet reduced to bread and water, and after the third offence, were liable to be ejected.‡

Matthew Paris has left us a copy of the vow which the lepers of the hospital of St Julian at St Alban were obliged to take before admission. I append a translation of it as a document highly illustrative of this part of our subject.

"I, brother, B, promise, and, taking my bodily oath by touching the most sacred Gospel, affirm before God and all his saints in this church, which is constructed in honour of St Julian the confessor, in the presence of Dominus R. the Archdeacon, that all the days of my life I will be subservient and obedient to the commands of the Lord Abbot of St Albans for the time being, and to his archdeacon; resisting them in nothing, unless such things should be commanded, as would militate against the Divine pleasure. I will never commit theft, nor bring a false accusation against any one of the brethren, nor infringe the vow of chastity, nor fail in my duty by appropriating anything or leaving anything by will to others, unless by a dispensation granted by the brothers. I will make it my study wholly to avoid all kind of usury, as a monstrous thing, and hateful to God.§ I will not be aiding and abetting, in word or thought, directly or indirectly, in any plan by which any one shall be appointed custos or master of the Lepers of St Julian, except the person appointed by the Lord Abbot of St Albans. I will be content, without strife or complaint, with the food and drink, and other things given and allowed me by the master, according to the usage and custom of the house. I will not transgress the bounds prescribed to me, without the special license of my superiors, and with their consent and will; and if I prove an offender against any article named above, it is my wish that the Lord Abbot or his substitute may punish me according to the nature and amount of the offence, as shall seem best to him, and even to cast me forth an apostate from the congregation of the brethren, without hope of remission, except through the special grace of the Lord Abbot."[*]

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* Paris, Historia Angli, (Edit of 1644) Additam, p. 169.

† As in the hospital of St Laurence, Canterbury, which contained lepers of both sexes. See Strype's Life of Archbishop Parker, 1791, Vol. i. p. 224.

‡ Surtees' Durham, Vol. i. p. 286.

§ In a passage breathing the very spirit and prejudices of the middle ages, Mezeray states that during all the twelfth century, two very cruel evils (deux maux tres cruels) reigned in France, viz. *leprcsy* and *usury*; one of which (he adds) infected the body, while the other ruined families.—Historie de France, Tom. ii p. 169.

I have only very briefly to advert to one other subject, before closing these remarks on the government of the English leper hospitals. I have already alluded to a special order of knighthood having been established at an early period for the care and superintendence of lepers. Belloy[†] carries back the origin of this order in Palestine to a very early period in the history of the Christian church. We know as a matter of greater historical certainty that the knights of St Lazarus separated from the general order of Knights Hospitallers about the end of the eleventh or commencement of the twelfth century.[‡]

From the locality of their original establishment, and from their central preceptory being near Jerusalem, they were at first generally designated Knights of St Lazarus, or of St Lazarus and St Mary of Jerusalem. Latterly they were conjoined by different European Princes with the Military Orders of Notre-Dame, Mount Carmel, and St Maurice.[§]

Saint Louis brought twelve of the Knights of St Lazarus into France, and entrusted them with the superintendence of the Ladreries or leper hospitals of his kingdom.[||] The first notice of their having acquired a footing in Great Britain is in the time of King Stephen. During the reign of that sovereign, their head establishment in England at Burton Lazars, Leicestershire, was built by (as Nicols[‡] states) a general collection throughout the kingdom, but chiefly by the assistance of Robert de Mowbray. Here they gradually acquired considerable wealth and possessions.[**] I find that the Hospitals of Tilton, of the Holy Innocents at Lincoln, of St Giles, London, the Preceptory of Choseley in Norfolk; and perhaps various others were betimes annexed to Burton Lazars as cells containing "fratres leprosos de Sancto Lazaro de Jerusalem." Nicols has printed not less than thirty-five charters relating to the House of Burton Lazars. Its privileges and possessions were confirmed by Henry II. King John, and Henry VI. It was at last dissolved by Henry VIII.[*] The only settlement of the Knights of St Lazarus in Scotland that I have been able to find, was in the town of Linlithgow, and the notice of it is very imperfect and unsatisfactory. It is contained in a document of the reign of Alexander II., and preserved in the Cartulary of Newbottle, in which reference is expressly made to land held "de Fratribus de Sancto Lazaro" at Linlithgow.[†] That the Lazarites had an establishment or establishments in Scotland as well as in the sister kingdom, appears borne out by a fact recorded by Helyot,[‡] that in 1342, John Halliday, a Scotsman, was appointed Governor of the Knights of St Lazarus both in England and Scotland, by the Grand Master of Boigny in France, who was at that period the reputed head of the order. Indeed Pennecuik, on the authority of Maimbourg, (Histoire des Croisades,) asserts that the "Knights of St Lazarus were numerous everywhere, but especially in Scotland and France."[§]

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[*] Historia Angli, &c. Appendix, p. 164.

[†] De l'Origine de Chevalrie, chap. ix. p. 126.

[‡] L'Histoire du Clerge Seculier, &c. See Table from it in Taylor's Index Monasticus, p. xxvii.

[§] Helyot's Histoire des Ordres Religieux, (edit. of 1792), Vol. i. p. 257.

[||] Rivius' Historia Monast. Occident. (1737,) p. 223.

[¶] History and Antiquities of Leicester, Vol. ii. p. 72.

[**] There was in England at least one alien cell of Lazarites, at Lokhay, Derbyshire, subject to a French house. Tanner's Notitia Monastica, p. 83.

The first and original object of the Knights of St Lazarus seems to have been the care probably of the sick generally, but in a special manner of those affected with leprosy.[||] They received lepers into their order, superintended the inmates of the lazar-houses, and till the standing rule to the contrary was allowed to be changed by Pope Innocent IV., they were obliged to elect a leper to be their Grand Master;[¶] "eatenus consuetudine observatâ ut Miles leprosus domûs Sancti Lazari Hierosolymitani in ejus Magistrum assumeretur."[**]

Toussaint de S. Luc in his History, Ceremonials, &c. of the Order of St Lazarus after it was united in 1608 by Henry IV. of France to those of Notre-Dame and Mount Carmel, states that the candidates for this united knighthood were obliged upon the Holy Evangelists to swear *inter alia*, "to exercise charity and works of mercy towards the poor, and particularly lepers, *(et particulièrement les lepreux.")*[††]

What extent and what kind of sway, if any, the Lazarite Knights of England and Scotland were ever allowed to exert over the lepers of the kingdom generally, or over the inmates of these leper cells and hospitals that more especially belonged to them, I have not been able to ascertain from any of the British historical records of the middle-ages that I have had an opportunity of consulting. It is, however, only too probable that the Lazarites, like most of the other early orders of knights, were induced, by pride and avarice, to turn from their original objects of love and charity to others, to views of power and aggrandizement for themselves.

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[*] Monasticon Anglicanum, 2d ed. vi. p. 632. Notitia Monastica, p. 239.

[†] MS. Cartulary of Newbottle Abbey, p. 205, Advocates' Library Edinburgh. Since writing the above I find that Maitland in his History of Scotland, includes, but without any references or details, the institution of Lazarites at Linlithgow, among his meagre list of Scottish Hospitals, Vol. i. p. 269.

[‡] Histoire des Ordres Religieux, Tom. i. p. 264.

[§] Historical Account of the Blue Blanket, &c. containing the fundamental principles of the Good-Town, (Edin. 1722) p. 6. Probably the Lazarites are here confounded with the Hospitallers or Knights of St John.

[||] Geddes' Tracts. View of all the Orders of Monks and Fryars in the Roman Church. London (1794) p. 46.

[¶] Helyot, Tom. i. p. 262, and Moehsen's Commentatio Prima de Medicis Equestri dignitate Ornatis, (1750) p. 56.

[**] Bul. Rom. Tom. ii. Const. 95, Pii iv. § 4.

[††] Abrégé Hist. de l'Ordre de Notre-Dame, &c. or Helyot, Tom. i. p. 297.

### EXTENT OF ENDOWMENT OF THE HOSPITALS; DIET, &C.

Most of the Scottish leper-houses were very poorly or not at all endowed. Their principal subsistence seems to have been derived from casual alms. Each of the doomed inmates of the hospitals was, like the leper-struck heroine of the old Scottish poet, Henryson, by

. . . . cauld and hounger sair
Compellit to be ane rank beggair.[*]

The inmates of the Greenside or Edinburgh lazar-house were allowed four shillings Scotch, (about fourpence Sterling) per week, and for the remainder of their subsistence they were, according to the original rules of the institution, obliged to beg at the gate of their hospital.[†] The leper-house at Aberdeen was supported from the public funds of the town; but in 1591 James VI. granted a charter to "Robert Abell and remanent of the pure (poor) leprous personis, and thair successors" in the hospital to draw one peat of custom from every load of them brought to the markets of Aberdeen, in consequence (as the words of the original charter bear) "of the smallness of the rent appointit for the leprous personis in the Hospitall being unable to sustene thame in meet and fyre, quhairthrow they leif verie miserablie."[‡]

Other Scottish lazar-houses, however, were comparatively wealthy. Thus I have already mentioned that the Kingcase Hospital, near Ayr, had some large and extensive land properties attached to it.

The inmates of most of the smaller English leper-houses seem also to have principally depended for their subsistence upon the precarious contributions of the charitable. One of the lepers of the hospital at Beccles was, by a royal grant, empowered to beg for his leprous brothers.[§] Several of the larger English hospitals, however, were well endowed, and the food, clothing, &c. of the inmates amply provided for.

In some instances these endowments consisted of the accumulations of large and voluntary charities;—in others they were made up of rich grants, left for the avowed purpose of founding chantries for the spiritual peace and pardon of the donor and his family; and in other cases, again, they were originally obtained as direct propitiations to the church for misconduct and crime. Indulgences[*] of forty days pardon seem to have been occasionally granted by the bishops and other ecclesiastical dignitaries to all the benefactors of the hospitals.

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[*] Testament of Cresseid, (Bannatyne Club edition 1824), p. 20.
[†] Edinburgh Town-Council Records, Vol. ix. p. 123.
[‡] See a copy of the charter in Kennedy's Annals, Vol. i. p. 167.
[§] Taylor's Index Monasticus, p. 12.

A bull of Pope Alexander III., which has been already referred to, granted all leper-hospital possessions an exemption from the payment of tithes.[†] The canon was not universally adhered to in England, for, in the account which Archbishop Parker drew up in 1562 of the hospitals in the diocese of Canterbury, while Herbaldone and Bobbing leper-houses are reported as "not charged with the taxes of the tenths," it is declared of the leper-hospital of St Laurence, Canterbury, that "the same is taxed and payeth the perpetual tenth."[‡]

From the "*Valor Ecclesiasticus*," taken in the time of Henry VIII. it appears that, whilst forty-eight hospitals, leper-houses, and lazar-houses in the diocese of Norwich and county of Norfolk possessed only a revenue of about L. 158 in all,[§] the rentals, on the other hand, of certain individual hospitals were comparatively great for that period. Thus the revenues of Herbaldone[‖] Hospital, Kent, and St James's, London,[¶] were each rated at L. 100; of Sherburne above L. 140;[**] of Maiden Bradley at near L. 200,[††] and those of the establishment and "veri fair hospital," (as Leland terms it,)[‡‡] of Burton Lazars were valued above L. 260.[§§] In some of these richer institutions the inmates were, as I have just remarked, well provided for. As illustrative of this I may quote the diet-table, &c. of one or two of the wealthier leper hospitals. Thus, among the rules published in the Additamenta to Matthew Paris, as established, about the middle of the fourteenth century, by the Abbot Michaele for the leper-house of St Julian near St Albans, we find the following regulations laid down with regard to the commons of the leprous brothers, (de distributionibus fratrum leprosorum.)[‖‖]

"Let every leprous brother receive from the property of the hospital, for his living and all necessaries, whatever he has been accustomed to receive by the custom observed of old in the said hospital, namely, every week seven loaves, of which five shall be white and two brown, made from the grain as thrashed from the ear; also, every seventh week, fourteen gallons of beer, or eightpence, (octo denarios,) for the same. Let him have, in addition to this, on the feasts of all the saints, on the feast of Saint Julian, the purification of the Blessed Mary, the Annunciation, the Trinity, Saint Albans, Saint John the Baptist, the Assumption of the Blessed Mary, and the Nativity of the same, for each feast, one loaf, one jar of beer, or a penny for the same, and one obolus, which is called the charity of the aforesaid hospital; also, let every leprous brother receive, at the feast of Christmas, forty gallons of good beer, or forty pence for the same. Also, let each receive on the said feast his share of two quarters of pure and clean corn, which is called the great charity. Also, at the feast of St Martin, each leper shall have one pig from the common stall, and that there may be a fair division of the pigs amongst the brothers, according to the custom observed of old, we desire that the pigs, according to the number of the lepers, may be brought forward in their presence, if it can conveniently be done, otherwise in another place fit for the purpose, and there each, according to the priority of entering the hospital, shall choose one pig, (otherwise a sum of money to be distributed equal to the value of the pigs.) Also, each leper shall receive on the feast of Saint Valentine, for the whole of the ensuing year, one quarter of oats. Also, about the feast of St John Baptist, two bushels of salt, or the current price. Also, at the feast of St Julian, and at the feast of St Alban, one penny for the accustomed pittance. Also, at Easter one penny, which is called by them "Flavvonespeni." Also, on Ascension-day one obolus for buying potherbs. Also, on each Wednesday in Lent, bolted corn of the weight of one of their loaves. Also, on the feast of St John the Baptist, four shillings for clothes. Also, at Christmas, let there be distributed in equal portions among the leprous brothers, fourteen shillings for their fuel through the year, as has been ordained of old for the sake of peace and concord. Also, since, by the bounty of our Lord the King, thirty shillings and fivepence have been assigned for ever for the use of the Lepers, which sum the Viscount of Hertford has to pay them annually at the feasts of Easter and Michaelmas, we command that the said 30s. and 5d. be equally divided among them in the usual manner; and we desire the brothers to be contented with the aforesaid distributions, which have been accustomed to be made amongst the leprous brothers of old: But the residue of the property of the said hospital, we order and decree to be applied to the support of the Master and Priests of the said Hospital."

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[*] Taylor's Index Monasticus. See instances at p. 57 and 60.

[†] Monast. Anglic. Tom. ii. p. 365, and Hist. Angl. Scripta edit. Lond. 1652, Coll. 1450, l. 4.

[‡] Life and Acts of Matthew Parker, by J. Strype, 1791, Vol. i. p. 224-26.

[§] Taylor ut supra, p. 127, Table of Revenues.

[‖] Dugdale's Mon. Anglic. 2d ed. Vol. vi. p. 652.

[¶] Ib. p. 637.

[**] Val. Ecclesiast. Temp. Henr. VIII. Tom. v. 1825, p. 308.

[††] Ib. p. 645.

[‡‡] Itinerary through England, &c. (by order of Henry VIII.) Hearne's edit. Vol. v. p. 105.

[§§] Monast. Anglic. vi. p. 632; or Throsby's History and Antiquities of Leicester, Vol iii. (1790), p. 175.

[‖‖] Paris' Historia Angli, &c. Additamenta, p. 163.

The dress of the lepers is laid down in regulations equally precise. "The brothers are to have a tunic and upper tunic of russet, with a hood cut from the same, so that the sleeves of the tunic be closed as far as the hand, but not laced with knots or thread after the secular fashion. They are to wear the upper tunic closed down to the ancles, and a close cape of black cloth, of the same length with the hood, as they have been accustomed of old." A particular form of shoe was also ordered, and if the order was disobeyed, the culprit was "condemned to walk daily barefooted until the master, considering his humility, said to him—enough."—P. 168.

The diet-roll of the large hospital at Sherburne is still more complex than that of St Julian's. I extract the heads of it, and of some other particulars with regard to the internal economy of the house from Surtees' elaborate work, in which copies of the original documents are given at full length.

The daily allowance of the Lepers of Sherburne was a loaf weighing five marks, and a gallon of ale to each; and betwixt every two, one mess or commons of flesh three days in the week, and of fish, cheese, or butter, on the remaining four; on high festival, a double mess; and, in particular, on the feast of St Cuthbert, in Lent, fresh salmon, (*salmones recentes*), if it could be had; if not, other fresh fish; and on Michaelmas day, four messed on one goose. With fresh fish, flesh, or eggs, a measure of salt was delivered. When fresh fish could not be had, red herrings (*allecia rubea*) were served three to a single mess; (and it was specially enjoined that they, or aught that was served up, was not to be putrid, nor corrupt, nor from animals that had died of disease;*) or cheese and butter by weight; or three eggs. During Lent, each had a razer (*rasarium*) of wheat to make furmenty, (*simulam*), and two razers of beans to boil; sometimes greens or onions; and every day, except Sunday, the seventh part of a razer of bean meal, but on Sunday, a measure and a half of pulse to make gruel. Red herrings were prohibited from Pentecost to Michaelmas, and at the latter each received two razers of apples. The lepers had a common kitchen, and a common cook, fuel, and utensils for cooking, &c. viz. a lead, two brazen pots, a table, a large wooden vessel for washing or making wine, a laver, two ale fats, and two bathing fats.

The sick had fire and candle, and all necessaries, until they either convalesced or died; and one of the chaplains was assigned to hear the confessions of the sick, to read the gospel to them on Sundays and holidays, and to read the burial-service for the dead. The old woman who attended on the sick had every week three wheaten loaves, and one mess of flesh or fish; and when a brother or sister was buried, the grave-digger had his meat and drink. Each Leper had a yearly allowance for his clothing of three yards of woollen cloth, white or russet, six yards of linen, and six of canvass, and the tailor had his meat and drink the day on which he came to cut out their clothes. Four fires were allowed for the whole community. From Michaelmas to All Saints, they had two baskets of peat on double mess days, and four baskets daily from All Saints to Easter. On Christmas eve, they had four yule logs, each a cart-load, ("unusquisque erit unius quadrigatae"), with four trusses of straw; four trusses of straw on All Saints eve and Easter eve; and four bundles of rushes on the eves of Pentecost, St John Baptist, and St Mary Magdalene; and on the anniversary of Martin de Sancta Cruce, every leper received five shillings and fivepence in money.

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* Sed bene cavendum quod nec putridum, nec corruptum, vel morticinum illis rogetur.

The good food, lodging, and raiment provided by the rich endowments of Sherburne were not without some alloy. The rules of the house were strict, and the religious duties enforced upon the inmates were of an austere character. "All the leprous brethren, whose health permitted, were every day expected to attend matins, nones, vespers, and complines. The bed-rid sick were enjoined to raise themselves, and say matins in their bed; and for those who were still weaker, let them rest in peace, *et quod dicere possint dicant.*" During Lent and Advent, all the brethren were required to receive corporal discipline three days in the week, and the sisters, in like manner, *donec omnes vapulent.* And all these, and other laws, Bishop Kellaw "did by his charter confirm and order ever thereafter '*inviolabiter observari.*'"*

On the Continent, the lazar hospitals partook of the same differences in regard to poverty and wealth as we have traced in Britain. In France, some of them, however, had become so very amply endowed by the commencement of the fourteenth century, that they at last excited the avarice of Philip V., who subjected many of their inmates to the flames.† "They were burned alive," *(ou les bruloit tout vifs)*, says the historian Mezeray, "in order that the fire might purify at one and the same time the infection of the body and that of the soul."‡ The ostensible cause for this act of fiendish barbarity was the absurd allegation, that (as the original ordonnance of Philip bears§) the lepers of France and other parts had been bribed to commit "the detestable sin and horrible crime (detestabile flagitium et crimen horrendum)" of poisoning the wells, waters, &c. used by the Christians. The real cause, there is little doubt, was a desire, through this flimsy excuse, to rob the richer hospitals of their funds and possessions; and this appears only too strongly in the anxiety displayed in the special wording of Philip's original edict, that all the goods of the Lepers be lodged and held for himself, (ordinassemus, *inter alia*, quod omnia bona eorum ad manum nostrum ponerentur et tenerentur.")* The persecution of them was again temporarily renewed in 1388, under Charles VI. of France.†

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* Surtees' History of the County of Durham, Vol. i. p. 129 and 286.

† Chronicon de Lanercost, (Edinburgh, 1841), p. 241. Chronica Th. Walsingham in Camden's Anglica, &c. a Veteribus Scripta, (1603), p. 113. Hume's History of England. (Ed. of 1792.) Vol. ii. p. 370.

‡ Histoire de France, Mezeray. Tom. ii. p. 72. Velley, &c. Tom. ii. 292.

§ Ordonnances des Roys de France de la Troisieme Race, (1723). Tom. i. p. 814.

## DATES OF THE APPEARANCE AND DISAPPEARANCE OF LEPROSY IN GREAT BRITAIN.

Much has been written regarding the date of the first appearance of Leprosy in western Europe.

By Astruc,‡ Bach,§ and others, it has been averred that the leprosy of the middle ages was introduced from the East by those who returned from the Crusades. Some of our own historians, as Fuller‖ and Heron,¶ allege that by this means it first reached Great Britain. It is quite possible, allowing the disease for the sake of argument to be contagious, that through the increased international intercourse of that period, it may have been propagated more rapidly and widely than would otherwise have occurred; but there are ample reasons and proofs for believing that it existed on the Continent of Europe, and even as far westward as England, before the Crusade fanaticism had drawn any converts from this country.

The first relay of Englishmen engaged in the crusade left in 1096, and returned two years afterwards. Several English leper-houses were founded before that period.

Lanfrance, Bishop of Canterbury, and the ecclesiastical favourite of William the Conqueror, died, according to the evidence of the Saxon Chronicle, in 1089,** seven years previous to the first crusade. During his lifetime he founded two hospitals near Canterbury, one a house built of stone (lapideum domum decentem et amplum) for patients affected with various descriptions of diseases, (variis infirmitatum qualitatibus), and the second an hospital constructed of houses of wood, and specially set aside for Lepers (ligneas domos ad opus leprosorum.)†† Somner states that this latter institution still exists at Canterbury as a charitable establishment.‡‡ Other English lazar-houses were probably of as early a date, or at least earlier than the first emigration for the crusades. Brigges alleges that the leper-house of St Leonards in Northampton was founded in William I. reign,[*] or before 1087; and one at Chatham was, according to Tanner, in existence before the termination of the short reign of his son, William Rufus.[†]

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* Ib. loc. cit. This Ordonnance is dated Crecy, 16th August 1321.

† Velley, Villaret, &c. Histore de France, Vol. vi. p. 239.

‡ De Morbis Veneriis. (Ed. of 1740), p. 7.

§ Letter to Von Troil in his work on Iceland, p. 323.

‖ History of the Holy Warre, (1647), p. 254.

¶ General History of Scotland, (1794.) Vol. ii. p. 266.

** Ingram's Edit. of the Saxon Chronicle 1823, p. 302. See also Wharton's Anglia Sacra, Tom. i. p. 264—and Gervase in Leland's Collectanea de Rebus Britannicis (Hearne's Edit.) Tom. i. p. 263. Dr Lingard, in his History of England, Vol. ii. p. 44 of 2d edit., states on the authority of Ordericus Vitalis, &c. the date of Lanfranc's death as 1079, which, if correct, and not a mere misprint, would only add to the force of the argument in the text.

†† Antiquities of Canterbury, Vol. i. p. 42, and Vol. ii. p. 169.

‡‡ Eadmeri Historia Novorum sive Sui Seculi, p. 9.

But more than a century even previous to the date of which we speak, leprosy had been made a subject of legislation in Great Britain. In a parliament held by Pepin, King of France in 757 at Campiegne, it was enacted that Leprosy in a husband or wife be regarded as a cause of separation, and that the sound party might again remarry.[‡] Lobineau, in his History of Brittany[§] tells us as one of the effects of this law of divorce, that among the higher ranks of the city of Dol, there were a number (*quantité*) of husbands who had as many as three wives living at the same time. Now among the earliest extant code of laws enacted in any part of Britain, those, namely, of the celebrated Welsh King, Hoel Dha, who died about the year 950,[‖] there is a canon to the same effect as that referred to, viz. that a married female was entitled to separation, and the restitution of her goods, provided her husband was affected with Leprosy.[¶] There is, however, as we shall afterwards see, great reason to believe that the word leprosy was then used as a generic term, including under it many different varieties of cutaneous affections.

I can offer nothing precise in regard to the exact period of the first introduction of Leprosy into Scotland. If, as I have already shown to be highly probable, the term Liberton is merely a conversion from leper town, it would render it likely that the disease was an early visitant of this country; for we know that Liberton is mentioned in various old charters of the reign of David I., who died in 1153.[**] In the Foundation Charter of Holyrood (1128) the mill and chapel " de Libertune"[††] are mentioned, and in the cartulary of Kelso, " William, parsona de Liberton," signs as witness to some charters dated during the latter half of the twelfth century.[‡‡] At a later date, there figures repeatedly in the ancient and well known verses of Blind Harry, as an occasional companion of Wallace.

" Thomas Gray, parsone off Libertone,"

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[*] History of Northampton, Vol. i. p. 363.

[†] Bishop Tanner's Notitia Monastica, edit. of 1744, p. 211.

[‡] Ruel and Hartmann's Collectio Conciliorum Illustratorum, 1675, Tom. iv. p. 100. The Lombards had a similar law, see Lindenbrog's Codex Legum Antiquarum 1613, p. 609.

[§] Histoire de Bretagne, Paris 1707, Tom. i. p. 204.

[‖] Wharton's Anglia Sacra, Tom. ii. Pref. p. 32.

[¶] Cambro-Briton, and Celtic General Repository, Vol. iii. p. 199.

[**] Chalmers's Caledonia, Vol. ii. 789.

[††] Liber Cartarum Sancté Crucis de Edwinesburg (Bannatyne Club edit. 1840) p.6.

[‡‡] Transactions of the Society of Scottish Antiquaries, Vol. i. p. 299.

a member of the church militant, who, on more than one instance, seems to have thrown aside his bell and book for the purpose of sharing in the brave struggles and hardy adventures of the Scottish patriot.

But I can adduce much more solid proof than this unstable philological basis affords, for stating that, as far back, at least, as the latter half of the twelfth century, the disease was not only known in Scotland, but that hospitals were by that time actually erected for the seclusion of the victims of it. The hospital of Auldnestum in Lauderdale, had, as I have already stated, three carrucates of land granted to it, as appears from the Melrose Cartulary, by Walter, the son of Alan. The date of this grant, as of most others in the old Cartularies, is not preserved, but it is a fixed and well ascertained fact in Scottish history, that the donor of it, the first of the illustrious, and afterwards royal line of Stewarts, died himself as a Cluniac monk in Melrose Abbey in the year 1177.*

William the Lion, who died in 1214, confirmed, as we have seen, a grant to the leper-house of Aldcamus; and the hospital of Rothfan, near Elgin, was evidently established during, if not prior to the reign of his son and successor, Alexander II. In the chapter of gifts to this Rothfan hospital, by John Byseth, Alexander is spoken of as the reigning prince; the preamble to the grant declaring that the endowment was bestowed "for the love of charity, for the soul of King William, and for the salvation of my noble lord King Alexander, (pro salute dominis mei Alexandri nobilis Regis)† Alexander II. died in 1249, so that by this time the disease was certainly spread to the more northern parts of the kingdom.

All Scottish records of these earlier times are almost, as I have already observed, so entirely lost, that it now seems impossible to ascertain whether any leper-houses existed in this kingdom at a date antecedent to those to which I have thus alluded. That this was the case, however, is not improbable.

Before the first notice of the earliest Scotch Leper-house that I have been able to trace, viz. that of Auldnestum, about 1170, similar establishments were abundant in England. The charters of many of them appear to have been either granted or confirmed in the reign of Henry I. who died in 1154, and was a contemporary of the Scotch Kings, Edgar, Alexander I. and David I.; and it is not unworthy of remark, that two, if not more, lazar-houses were founded in England by natives of Scotland prior to the date of the earliest Scotch Leper-house that I have been able to discover. For Malcolm IV. founded and endowed one in his principality of Huntingdon in 1165;* and sixty years earlier, or in 1101,† Matilda, the "gode Queene Maud" of Henry I. and daughter of Malcolm III. of Scotland, established the hospital of St Giles, Bishopgate, for forty lepers, a chaplain, clerk, and messengers.

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* Chronica de Mailros, a cod. unico in Bibl. Cott. servato. Bannatyne Club edition, Edinburgh, 1835, p. 88. Crawford's Genealogical History of the Family of the Stewarts, 1710, p. 5. Lord Hailes's Annals of Scotland, ed. of 1797, Vol. i. p. 327. Fordun gives the year as 1178, probably from a difference in the style of reckoning, see his Scotichronicon, Goodall's Edit. 1759, Tom. i. p. 475.

† Registrum Episcopatus Moraviensis, p. 77.

But at whatever respective periods the disease first appeared in England and Scotland, there are strong reasons for believing that it continued to prevail in the latter kingdom long after it had ceased, or almost entirely ceased in the former. In the preface to the statutes of the leper-house of St Albans, drawn up about 1350, and already referred to as published in the supplement to Matthew Paris's history,‡ it is stated, that the number of Lepers that presented themselves for admission had diminished so much by that time, that their expense of maintenance was below the revenue of the institution; "in general," it is added, "there are now not above three, sometimes only two, and occasionally only one." In exactly the same year (1350) that this report was drawn up for St Albans, was it thought necessary to institute the Leper-house at Glasgow; and nearly one hundred years later, or in 1427, the Scottish Parliament deemed it proper to legislate on the subject of lepers.

The hospital of St Mary Magdalene at Ripon was established in 1139 for the relief of all the lepers in that district. In the time of Henry VIII. it contained only two priests and five poor people to pray for all "Christen sowlez."§

At Illeford, in Essex, an hospital was instituted in the reign of Henry II. or Richard I. for thirteen lepers. In one of the reports of the commissioners for suppressing colleges, hospitals, &c. in the time of Edward VI. it is observed, in regard to the state of this Illeford Hospital, that though founded "to find 13 pore men beying Lepers, 2 pryests, and one clerke—thereof there is at this day but one pryest and 2 pore men."||

By the same commission most other lazar-houses were reported as having no leprous patients, and yet only a few years previously was the leper-house of Aberdeen built, and forty or fifty years afterwards (in 1591) the Edinburgh hospital at Greenside was established. We have several later notices of the disease among us. In the Aberdeen Kirk-Session Register, Vol. i. it is stated, that, on the 13th May 1604, the kirk-session ordained "Helene

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* Tanner's Notitia Monastica Huntingdonshire, ii. 3. Monast. Anglicanum, Tom. ii. p. 417.

† Paxton's Account of the Hospital and Parish of St Giles in the Fields. Stowe in his Survey of London, (Stryppe's edit. 1720, Vol. ii. Book iv. p. 74,) says it was founded about 1117, (the year preceding Matilda's death.)

‡ Angli Historia Major, Append. p. 161.

§ Monasticon Anglicanum, 2d ed. Vol. vi. p. 620.

|| Ibid. Vol. vi. p. 630.

Smythe, ane puir woman infectit with Leprosie, to be put in the hospitall appoyntit for keeping and haulding of lipper-folkis betwixt the townis; and the keyis of the said hospitall to be deliverit to her."*

As late as 1693, we have some records of the Lepers of Kingcase. On the 11th March of that year, a complaint was lodged by the procurator-fiscal "anent the intruding of the lepers of Kingcase upon the priviledges only propper to the burgess and freemen (of Prestwick) by there resorting to the shoar, and taking up certain timber and other wrack, and casting greater quantities of peats and turf off the common and moss, &c. which, being seriously pondered by the magistrates, &c. they ordained that none of the said Lepers of Kingcase do so under the penalty of ane hundredth pund, *toties quoties*, to be paid by ilk ane (each one) of them in caise of failyie, (failure)."†

The disease appears to have continued in the northern islands of Scotland long after it had disappeared from the mainland of Scotland, and indeed, all other parts of Great Britain. In Shetland it has been known for centuries. I have already made a quotation from Brand to show that it was at Lerwick as late as the latter part of the seventeenth century. In some districts of Shetland it continued still later. Apparently most of those there affected, either belonged to or were sent to the Island of Papa. I have in my possession a MS. extract from the session books of Walls, showing the expenses incurred in keeping the lepers at Papa from 1736 to 1740. Four of them appear to have died during these years, and two of the entries are for the "tobacco"‡ used at their funerals. In 1742 there is a long entry in the session Records of Walls, earnestly enjoining a day of public thanksgiving for the supposed total deliverance of the country from the effects of the leprosy.

The disease, however, was not eradicated entirely. Mr Jack, the resident clergyman, who wrote the account of the parish of Northmaven for the Statistical Account of Scotland, published in 1798, seems to have seen what he terms several miserable cases of the disease, and adds, that in many instances there is reason to suspect a hereditary taint.§ Dr Thomson urged his pupil, Dr Edmondston of Lerwick, to trace out the history of the disease in the north, and that gentleman has made the following observations upon it in his work on the Zetland Isles.

"Elephantiasis, known by the name of leprosy, was very frequent in Zetland about sixty years ago, but its occurrence since that time has only been occasional, and at present scarcely an instance of it is to be met with. A native of Zetland, a few years ago, was received into the hospital of Edinburgh, labouring under true elephantiasis. I have seen obscure degrees of it in Zetland, where the face was bloated, the skin scaly and rough, and the voice slightly hoarse; but they did not terminate fatally, nor was the affection apparently communicated to others. The last instance I saw of it was in the person of a boy. His friends could assign no cause for its appearance, and said that it had come on spontaneously, and proceeded gradually. The disease had been stationary for some time before it fell under my observation."*

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* Book of Bon-Accord, p. 342.

† Records of Prestwick, p. 91.

‡ Was it used as a preventive or disinfecting agent? In some districts in Scotland at the present day, all the attendants upon a funeral are regularly provided with tobacco and pipes, at the expense of the relatives of the dead person.

§ Sinclair's Statistical Account of Scotland, Vol. xii. p. 346.

As so far confirmatory of the disease having thus longer remained in Shetland than in the more southern parts of these kingdoms, I may here mention that in the middle-ages it was very common,† and has since long continued to linger in the neighbouring Faroe Islands, and in Iceland. It appears from Debes'‡ evidence that true tubercular leprosy, as we shall see in the sequel, continued to prevail in the Faroe Islands (the nearest land north of Shetland) in the middle of the seventeenth century. Still later, viz. in 1768, Petersen§ found 280 lepers in the hospitals in Iceland. Olafsen,‖ Troil,¶ Holland,** and Henderson,†† have each, from personal observation, described the disease as existing in that island; and the French Government expedition in 1836 under Gaimard,‡‡ have, in the beautiful work they are at present publishing, already given several excellent coloured sketches of natives affected with tubercular Leprosy. The disease, according to various authors, still prevails in the northern kingdoms of Norway and Sweden. I am not by any means sufficiently intimate with the literature of the Scandinavian Radeseyge, to venture to offer any decided opinion with regard to its nosological nature, and its alleged relation to the Leprosy of the middle-ages. As far, however, as I am acquainted with the subject, it appears to me that under the name of Radesyge, two, if not more distinct species of disease were, by Holst and the other authors who first wrote upon it, confounded and described together. One of these, the Radesyge, properly so called, is probably nearly allied to, if not identical with, the Sibbens of Scotland. Another of the supposed varieties of the disease, the Spedalskhed or Spetälska seems, on the other hand, to be a different nosological species, hereditary, non-contagious, chronic, incurable, and identical in many, if not in all its characters, with true tubercular Leprosy. The Spetälska seems confined to particular and more limited localities in the north than the Radesyge; and when we look to the descriptions of it as seen at Ostrobothnia by Udmann,[*] or as given by Hünefeld,[†] in regard to the disease at Bergen, we certainly find these descriptions very exactly answering to the definitions of tubercular or Arabian Leprosy given by our best nosologists and pathologists, and which I shall have occasion afterwards to discuss at some length. Besides, Radesyge is a disease which is believed by many to have made its first appearance in Sweden and Norway during the last century, while the Spetälska was known at a greatly earlier date. The present hospital for it at Bergen was, as Hünefeld[‡] informs us, founded as early as the year 1268.

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* Ancient and Present State of the Zetland Isles, Vol. ii. p. 102.

† Bartholin De Morbis Biblicis Miscellanea Medica, (1672) p. 41.

‡ Faeroae et Faeroa Reserata, &c. (London, 1659.) p. 101 and 311, and Acta Medica, &c. Hafniensia. Tom. i. p. 98.

§ Memoires de Medecine for 1782–3, p. 200.

‖ Voyage to Iceland, (1770) p. 172.

¶ Letters on Iceland, (1780) p. 121.

** Dissert. Inauguralis de Morbis Islandiae, (Edinb. 1811) p. 12–17.

†† Iceland, or the Journal of a Residence in that Island, (Edinb. 1818) Vol. i. p. 295.

‡‡ Voyage en Islande et au Groënland, &c. Livr. 11, 12, 14, 15, &c.

In the second part I will take an opportunity of considering at length the nosological nature of the leprosy of the middle-ages, particularly as it was seen prevailing in Great Britain. I will inquire into the rank, age, &c. of those attacked, and point out some of the causes which have been considered as connected with the dissemination of the disease; and lastly, I will endeavour to bring together some of the strange regulations of medical police that were adopted in England and Scotland with regard to the infected.

(*To be concluded in next Number.*)

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## ART. II.—*Contributions to Anatomy and Physiology.* (Read to the Anatomical and Physiological Society in Edinburgh.) By DR KNOX.

### No. 3. *On Fracture of the Radius Bone near its carpal Extremity, with and without Complication.*

ON looking over my notes and museum presses, I find three cases of fracture of the radius near its distal extremity, alluded to or preserved. They all occurred in persons brought into the practical rooms for anatomical examination, so that little, if any thing, could be ascertained of their previous history. I shall speak of these cases not in the order in which they occurred, but in that of their relative simplicity or complexity, in so far, at least, as such a conclusion seemed supported by the pathological appearances.

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[*] Edinburgh Med. and Surg. Journal, Vol. xviii. p. 102, or Amoenitates Academicae, Tom. vii. p. 97.

[†] Edin. Med. and Surg. Journal, No. 132, p. 119. See also Dr Charlton's Observations on the Norway Hospitals, Ib. p. 105.

[‡] Die Radesyge oder das Scandinavische Syphiloid, (Leipzig, 1828) p. 57.

1*st*. During the present winter, the left arm of a stout muscular man had been selected for demonstration of the muscles, and being thus examined and described with every possible care in presence of a public class, makes it the less likely that any thing very important could escape the notice of so many lookers on. The arm so dissected, examined, and described, showed several remarkable varieties in the arrangements of the muscles, and more especially in having a *biceps flexor cubiti* muscle with four distinct heads or origins instead of two. The circumstance, however, which more immediately concerns the object of this memoir was, the presence of a pathological appearance, clearly indicating that a tone time or other the radius had been fractured obliquely, from within outwards, and from above downwards, commencing at the distance of about an inch and a half above its carpal articular surface.

Although I have repeatedly examined the bone with every possible attention, I find it impossible to speak more positively of it than this, that the fracture seems to have been caused by a heavy blow or body falling on this part of the arm ; that it had not completely traversed the bone, but descended into the joint; and thus the amount of osseous deposit uniting the fragments is found chiefly on one aspect of the bone, viz. its posterior and external aspect. These osseous deposits have deepened the grooves for the tendons, rendering them also irregular. Numerous orifices mark the increased vascularity of the bone, even at the time of death ; the cartilages of incrustation had suffered somewhat ; and a bridge of new formed bone had begun to shut in the tendon of the *flexor longus pollicis.*

But that to which I now beg leave especially to call the attention of my readers, is that no other morbid structure or lesion existed anywhere ; so that the injury, whatever it had been,—and I feel quite assured of its having originally been an oblique fracture of the radius,—had been confined to that bone, and extended neither to tendons nor ligaments. To be quite certain of this, I examined carefully all the tendons and joints, and even the superior radio-cubital articulation, but observed nothing morbid or irregular.

Having described what may be considered as a simple uncomplicated fracture of the radius, simple in every respect, excepting in so far, if my opinion be correct, that it extended into the joint, I shall now submit to the Society my second case of fracture of the radius near its carpal extremity.

*2d, Case of Fracture of the Radius, with dislocation of the lower Radio-Cubital Joint, and rupture or elongation of the Triangular Fibro-Cartilage of Weitbrecht.*—The arm in which I observed the pathological appearances just mentioned occurred in the practical rooms, and was dissected by Mr A.

Loy. It occurred in the right arm of a stout muscular woman; and though actually in its real situation previous to any dissection, the lower end of the ulna *seemed much displaced.* It projected beyond the line of the carpal and metacarpal bones, to the extent of rather more than three-quarters of an inch, and descended below the plane of the radius to nearly the same extent; neither could it be replaced by any force applied. On removing the extensor muscles, it became evident that there had been an oblique fracture of the radius, and a dislocation of the lower radio-cubital joint, accompanied by a *shortening* of the radius to the extent of nearly though not quite an inch. The fibro-cartilage of Weitbrecht had been either torn through and had afterwards reunited, or had been violently extended. I lean rather to the former opinion. At the point where it adhered to the radius, the synovial membrane was quite sound, but on looking through it between me and the light, the base was so thin as to warrant the idea that it had originally been torn from the bone at this point. In conclusion, with respect to this case, I may remark, that the joint retained all its motions, which were very carefully tried; the surfaces of the first row of carpal bones were quite sound, nor could any other morbid appearance be detected anywhere. I feel disposed to think that the fracture of the radius and *dislocation* of the radio-cubital joint took place at the same time, and from the same violence, but the confirmation or refutation of this I must leave to others, whose opportunities for observing such cases during the life of the patient, have been more extensive than mine.*

### *Description of Figures* 1 *and* 2, *Plate VI.*

*r.* Points out the posterior surface of the radius, and the part where the fracture had occurred.

*u.* The ulna.

*a. s.* Articular surface of the radius.

*c.* Triangular cartilage of Weitbrecht descending from the radius to the ulna. The radio-carpal joint has been laid open from the back.

Fig. 2 Gives a front view of the same preparation.

3. The case I shall next speak of was, like the first, observed in an arm dissected and described to the anatomical class. When I sat down to write these remarks, I had a full conviction of the preparation having been placed in the museum; but not being so fortunate as for the present to meet with it, the following description, necessarily imperfect, is taken from a drawing made at the time by my brother, and the references to the drawing must suffice. Unfortunately, it leaves some points of the case open to

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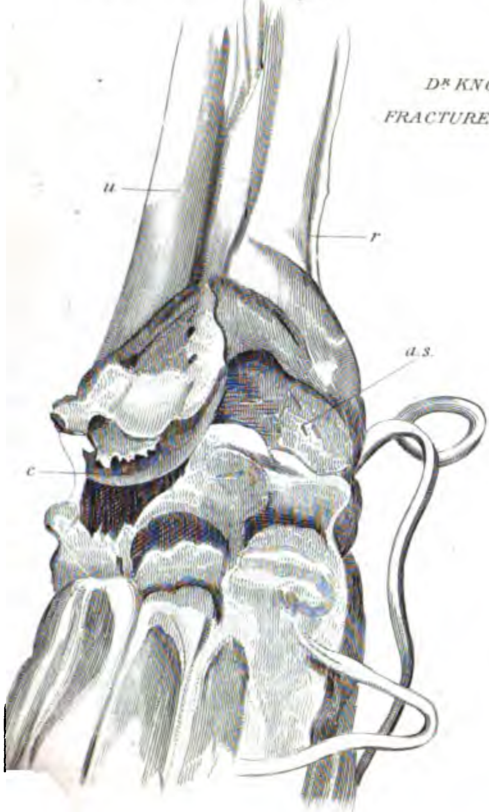
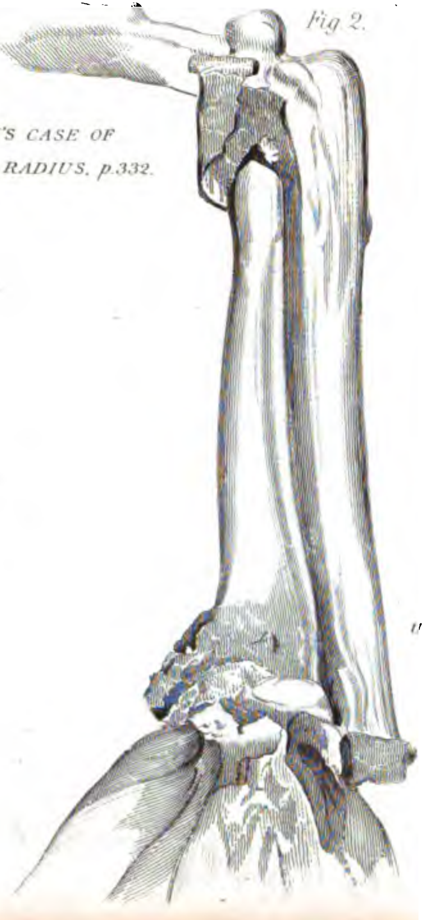
* I rather think that surgeons would have named this a case of fractured radius, and dislocated ulna; but this is quite an error, in as much as it was the radius and not the ulna which had been dislocated.

Fig. 1.



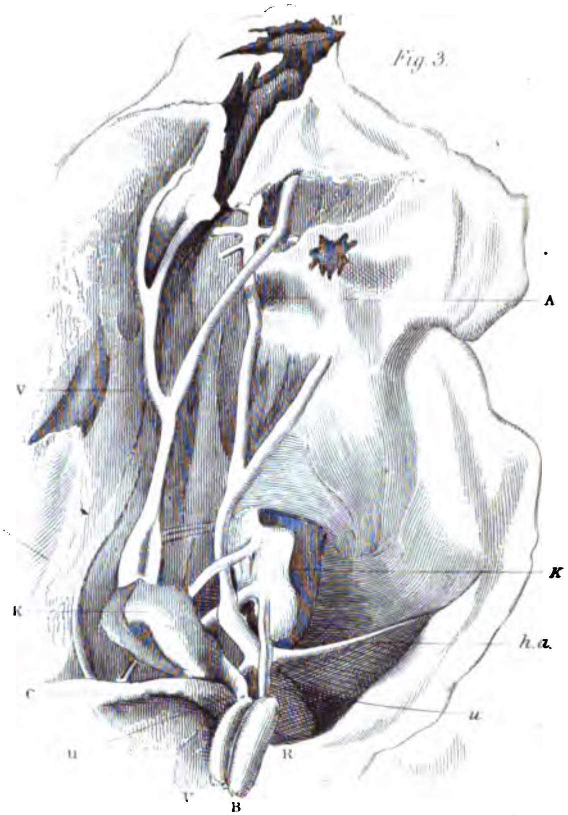
Dr KNOX'S CASE OF
FRACTURED RADIUS, p. 332.

Fig. 2.



Dr EMBLETON'S CASE, p. 123.

Fig. 3.



G. Aikman Sc.

doubt, as I cannot altogether trust my memory in respect to them.

The drawing now before me represents a dissection of the back of the hand, and of a part of the fore-arm of a stout muscular man. The lower end of the ulna *appears to have been dislocated*, and the radius broken (?) a short way above its carpal extremity.* But that which chiefly attracted our attention during the dissection and the description of the parts to the class, was the evidence the part afforded, that at one time or other the tendons of both radial extensors had been torn across, and had afterwards united with the tendon of the *extensor secundi internodi pollicis.* I have a distinct recollection of the impression the dissection made on my mind at the time; viz. that it seemed to explain the weakness said to follow some cases of sprained wrist, with or without fracture or dislocation.

To these cases I shall take the liberty of adding a fourth case, the dissection of which was made, and the preparation presented to me by my much esteemed friend, Mr Cornelius Philbrick, of Colchester, surgeon, and formerly demonstrator in my practical rooms.

The preparation which now lies before me consists of the lower extremity of the humerus of a person, who, as far as I recollect, was of low stature, but not remarkably so;—and yet the ulna, which does not seem to have suffered any fracture, measures only seven inches and a-half, whilst the shortest of a very large number, taken at random from the museum, measures nine inches. But, previous to describing the condition of the radius and carpal bones, I had better mention what changes had taken place in the humerus and ulna.

1*st.* The humerus, of which only about two inches of the lower part had been preserved, has a shaft of ordinary strength, and the breadth of the articular part, or rather between the extremity of one condyle and the other, is nearly as much as in the humerus of a skeleton of the usual stature now before me in the practical rooms. Thus, then, if the humerus of this person was really much shorter than usual, it does not show it on its distal extremity. The trochlea was unaltered; but the small articular head for the articulation with the radius was flattened, and had began to assume the ivory polish.

The most remarkable change which had taken place in the ulna was the alteration in the form of its small distal head, by which it articulates with the lower end of the radius. It had lost all relation with this part of the radius, descending nearly an inch lower down, flattened, and moreover sent a curious process upwards to support, as it were, the lower end of the radius, fitting in a singular way a notch on this aspect of the bone. The radius measures only five inches and a-half in length. The superior radio-cubital articulation was regular, but the inferior could not be easily described by words. The sketch, Plate VII. Fig. 1, and accompanying explanation, will best explain the changes which had taken place.

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* I use the word "appears," in respect to the ulna; in fact, it is the radius which is dislocated in these cases.

With respect to the distal articular surface of the radius, it also had undergone remarkable changes. The cartilage of incrustation had disappeared without the bone becoming ivory or polished; there is a deep excavation instead of a comparatively smooth surface. The corresponding scaphoid was singularly altered in form, so as to be scarcely recognizable; it presented a remarkable degree of the ivory polish on that surface which faces the radius; and most of the other bones of the carpus, more especially of the first row, were more or less altered both in form and substance. The change in form could only be rightly comprehended by examining them. Figures 3d and 4th of Plate VII. present views of the *os lunatum* and *os pyramidale*, changed in the manner now specified.

I trust I may be permitted to remark, without offence to any one, that the history of fractures of the radius, with or without dislocation or other mischief done the adjoining parts,—I mean, of course, their pathological history, does not seem to have been very fairly or faithfully recorded, in so far as I know, by any surgical author; M. Dupuytren being the only one who has treated the matter at a length worthy of its importance. Sir A. Cooper's remarks in his great work on dislocations are, of course, of great value, but extremely brief; and the pathological opportunities enjoyed by this most distinguished surgeon of inspecting injuries done the radius and wrist generally, and productive of fractures and dislocations, do not seem to have been very numerous. The subject is treated of rapidly and practically, no doubt, by Mr Liston in his excellent work entitled the Principles of Surgery; but little or nothing can be learned of the pathology of this class of injuries from the off-hand sketch contained in that and in similar works. I trust, therefore, I may be excused in calling the attention of practical surgeons and anatomists to the following points in the history of simple or complicated fractures of the radius.

*1st*, It has been established by pathological dissections, that, when great violence, direct or otherwise, has been done the hand and wrist, one or both the radial extensors may be lacerated, leaving probably a great degree of weakness in the joint, difficult to be accounted for on other principles. But it has not yet been shown, I believe, that these tendons have been lacerated without any fracture of the radius or dislocation of the wrist.

*2d*, I do not know that there has been recorded, with the necessary pathological proofs, a single case of dislocation of the radio-carpal articulation, unaccompanied by fracture of the radius.

*3d*, When a person falls forward with great violence, stretching out his hands by an instinctive effort to save the head and face, and a severe shock is transmitted from the hand upwards through

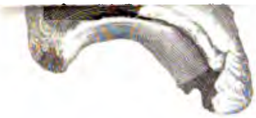


Fig. 3.

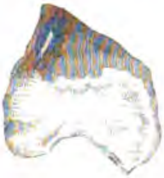


Fig. 4.

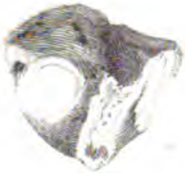
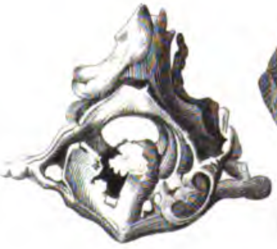
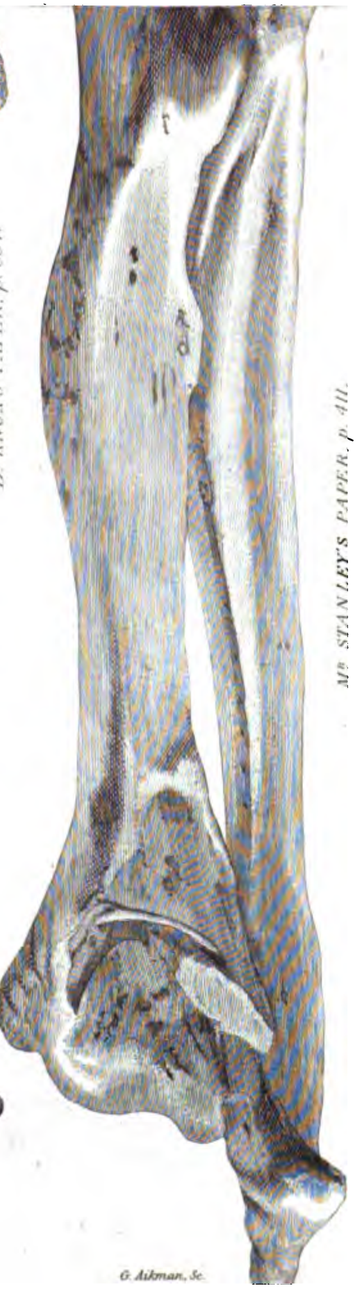


Fig. 8.



Dr KNOX'S PAPER, p. 334.



Mr STANLEY'S PAPER, p. 411.

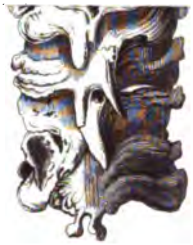


Fig. 6.

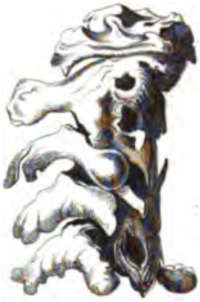
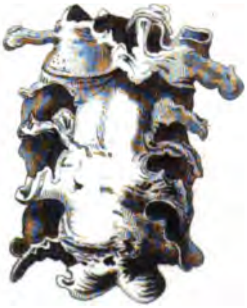


Fig. 7.



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the radius, one of two accidents must, I think, happen, and I have seen both pretty frequently; either the humeral end of the radius will start from its articular surface, tearing through the annular ligament, and give rise to a dislocation forwards or backwards of the head of the radius, upon or behind the humerus, or, in other terms, a dislocation of the radius in the upper radio-cubital articulation, or *2dly*, the radius will break at one or two points, and this may be either quite simple, in which case the radio-cubital articulations remain entire, and these bones hold to each other their exact normal relations; or, at the moment of fracture, by the same impulse, the triangular interarticular cartilage of Weitbrecht may be distended, lacerated, or torn through, by which means the lower fragment of the radius will leave its place; the bone becomes, as it were, shorter; and on examination the ulna is found to project below the level of the radius by half an inch or so, the hand is bent towards the radial side, and the styloid process and small head of the ulna projects beyond the plane of the fifth metacarpal bone. Now, it seems to me, with great deference to some practical surgeons, that they have mistaken slightly the nature of this accident, or, at the least, have employed terms warranting the supposition that its true pathological nature was not very perfectly understood by them. They call it "a fracture of the radius, with dislocation of the ulna;" but the ulna remains precisely where it was; it is the fragment of the radius which has abandoned its natural relations to the ulna, dragging the radial side of the hand upwards and outwards (or radially); it is, in fact, a dislocation of the radius, not of the ulna; and one of the cases I have related, together with that figured in plate 26 of Sir A. Cooper's great work, will readily prove this to any unbiassed mind.

I willingly admit that a dislocation of both bones might happen by a rupture of the interarticular cartilage; but this must be very rare in comparison with those I now speak of.

*4th.* The rupture of the triangular interarticular cartilage permitting of the shortening of the radius, must, I think, generally take place at the moment of the fracture; and I feel disposed, therefore, to consider the singular phenomenon of the frequent shortening of the radius after fracture, (a circumstance which I rather think has not been sufficiently attended to by the practical surgeon;) as depending solely on rupture of the interarticular fibro-cartilage which connects it to the ulna; but it is also possible that, in some cases, the ligament may be merely stretched or yield consecutively. But, be this as it may, the accident at all events, is not one of dislocation of the ulna, as surgeons imagine it to be.

Lastly, the extreme shortening of the radius is well shown in Case 3d; but in that case the bone must have been broken at two points. I may further add, that I have ascertained experimentally that the interarticular fibro-cartilage, forming a principal ligament in the inferior radio-cubital articulation, may be, although strong, much more readily torn in the dead subject than might at first be supposed. There is always a danger of pushing our conclusions too far, and therefore I merely venture to suggest that many cases of supposed dislocations of the ulna, and even of the wrist joint, refer merely to a "fracture of the radius close to its distal extremity, accompanied by a displacement of the lower fragment of fractured bone, set partially free by a rupture or laceration of the interarticular cartilage of Weitbrecht; and that these injuries give rise to, *first*, a *seeming projection and displacement* of the small head and styloid process of the ulna; and *secondly*, to a real dislocation of the broken radius, with a deep hollow or depression immediately below the end of the ulna, and a dragging away of the whole hand towards the radial side.

As I found it difficult to explain the very curious fact of a shortening of the fractured radius in some cases and not in others, I became desirous of comparing the preparations in my own museum with those of others. The vast collections of the College of Surgeons were at all times open to me, as being one of the Fellows of the College; and Drs Robertson and Handyside, with that liberality and candour which has ever formed so remarkable a feature in their character, not only gave me every access to their museums, but, in the kindest manner, pointed out circumstances connected with the history of such fractures, which, but for their suggestions, would have escaped my notice.

*1st*, In the museum of the College there are a few specimens of fractured radius, singly or combined with that of the ulna; but I did not observe any instance of fractured radius, which on reuniting had produced or been accompanied by that remarkable shortening of the radius only, and to which phenomenon, I again repeat the best practical surgeons of the day have either not adverted, or, so far as I know, have offered any explanation.

*2d*, In Dr Robertson's museum, I found four specimens of fractured radius, simple or combined, with a similar injury to the other bone, all of which had united by bone *without the smallest shortening of the radius.* These fractures were chiefly about the middle of the bone; but in one case the injury had happened close to the distal or carpal end of the bone.

But in the very valuable museum of Dr Handyside, I found preparations precisely similar to the two cases I have already described, and of which the preparations are in my own collection. Whilst examining these preparations I took the following notes, and Dr Handyside in the most liberal way offered me every explanation of the appearances which his acquaintance with the history of the cases enabled him to do. The first preparation was the left arm of an adult. The skeleton of the fore-arm and hand had been prepared naturally. The radius had been broken near the carpal extremity, and had united without any riding of the fragment; and yet it had become much shorter than natural, the ulna projecting beyond it nearly three-quarters of an inch. The specimen is in fact a counterpart of one of those I have already described as being in my own museum; but the radius is perhaps more bent, and by this a part at least of the shortening may be explained; indeed, both bones are a good deal twisted; the ligament of Weitbrecht appears not to have been ruptured but merely stretched. Dr Handyside assures me that the pelvis of the same person to whom the arm belonged was ricketty; but still this does not explain the shortening of the radius, independent of any riding of the fragments after certain fractures near the joint.

The second preparation of the same nature which I found in Dr Handyside's museum was also quite similar to the least marked case in my own museum. The Doctor knew nothing of its history. The skeleton of the fore-arm had been prepared artificially, so that the original condition of the ligament of Weitbrecht could not be ascertained.

Dr Handyside mentioned to me an important fact in the history of the particular kind of accident, the pathological history of which I have been endeavouring to explain. He had seen five such cases within three months in his private practice. He gave so clear an account of the appearances of the injured arm when the patients first presented themselves, so strictly according with the case I met with in the practical rooms, as to leave no doubt in my mind of their being identical; and that, in fact, "fracture of the radius near its carpal extremity, running not unfrequently into the joint, accompanied by a rupture or violent stretching of the triangular fibro-cartilage of Weitbrecht, or, in plain terms, a dislocation of the radius (not the ulna, as is generally supposed,) at its radio-cubital joint," is by no means an unfrequent accident. The seeming lengthening of the ulna and the hollow beneath it, caused by the drawing away of the hand to the radial side, is one of the most remarkable features of the case. Unless these cases of fracture be promptly recognized, and carefully treated, they do not recover well, always showing more or less deformity. This is Dr H.'s opinion.

In conclusion, it would appear, that, after certain fractures of the radius, a remarkable shortening of the bone takes place during the process of cure; which shortening of the bone admits of no explanation, unless on the supposition that at the time of fracture there occurred also a *dislocation of the carpal* end of the bone, the consequence of a laceration or rupture of the *triangular ligament of Weitbrecht.* On the other hand, it has been shown, that fracture of the radius, uncomplicated with any other injury, is not necessarily accompanied by a shortening of the bone. And further, that this shortening of the radius gives rise to many secondary pathological changes on the form, &c. of the wrist joint, and more especially of the scaphoid and semilunar bones.

## Art. III.—*Observations on Talipes, Strabismus, Stammering, and Spinal Contortion, and the best methods of removing them.* By James Braid, Surgeon, Manchester.

I. The first subject on which I shall submit the results of my experience is the treatment of talipes. Having operated upon 246 club feet, embracing every variety, and every age from 53 years to two days old, and having, in the course of this practice, tried a variety of modes of operation, the results of which I have watched with strict attention, I trust it may not be deemed presumptuous in me to consider myself entitled to offer an opinion different from some others who have written upon the subject, but whose opportunities of observation may not have been so ample as my own, however competent they might have been in other respects.

It is a remarkable circumstance, that, although club-foot must have existed since the earliest periods, it was not understood either as regarded its anatomy or treatment, until within the last few years. Up to that period, it seems to have been considered as depending upon a malformation of the bones of the tarsus and metatarsus, for which there was no remedy; and when the division of the *tendo Achillis* was considered as calculated to afford relief in the simpler forms of the affection, the theoretical dread of locked-jaw and death, as the consequence of such sacrilegious interference, was an effectual check to such a procedure. It is to Stromeyer we are indebted for the important discovery of a certain and safe mode of treating talipes by division of tendons and subsequent extension of the member.

Talipes consists essentially in a malformation of the bones of the tarsus, metatarsus, and toes, arising from rigid contraction, and ultimately permanent shortening of one or more muscles, calculated to produce this malposition, or the total or partial loss of the antagonizing muscles. The remedy consists in the division of the tendons of the contracted muscles, and making extension, whilst the lymph thrown out, for lengthening and cementing the divided extremities of the tendon, is still in a soft state, so that there may be ultimately a new portion of tendon ingrafted between the divided extremities. This was proposed and first practised successfully by Stromeyer. The other plan, first proposed and practised by myself, was by excising a portion from the tendons of the weakened or paralysed muscles, and making them reunite in a contracted state, which my experience has proved is sufficient to restore tone and contractility to the formerly weak or paralysed muscles. That this is not a hypothetical but a correct view of the case, can be proved by specimens in my possession, as I have many examples of tendons which have been excised, with the results named, and also two from the human subject, and two of a dog where division and extension, and the implantation of a new portion of tendon has been the result. That of the dog was performed as a physiological experiment. Of the specimens obtained from the human body, one was from a patient who had been successfully operated upon for talipes; but who, some time after, from incautious exposure to cold, had inflammation of the lungs supervening on tubercles which ended in death, when I requested permission to preserve a specimen of the *tendo Achillis;* and the other was from a patient, aged 38 years, who had been operated upon most satisfactorily for one foot,—a congenital varus,—which was perfectly well, so that he could walk in ten days. On the sixteenth day, I operated upon the second foot; but, instead of attending to my instructions on this occasion,—as he had with the first,—to keep quietly in bed for a few days, I had not left the house more than an hour and a-half when he caused a servant to carry him down stairs and out of doors, although the weather was intensely cold; and after this to be carried into the house and placed before a large fire for the remainder of the day, where, with both feet on the ground, he regaled himself with porter. The result was an attack of erysipelas, which at that time prevailed here epidemically, and in consequence of which, in defiance of my best endeavours, aided by my talented friend, Dr J. L. Bardsley, the patient died in ten days after the operation. The family, aware that the fatal result of the case was solely attributable to the imprudence of the patient, kindly granted me permission to remove a portion of the *tendo Achillis*, which I now possess, and consider a most valuable specimen, as being procured twenty-six days after the operation, and which proves, beyond the possibility of doubt, that tendons, which have been divided and extended, reunite by tendinous matter. In this case there is about one inch and a-half of new substance, the full size of the original one, which was very thick, as all my professional friends who have examined the preparation admit. The other specimen, as well as the two of the dog, all proving the same fact, there can no longer be any doubt on the subject.

I think there can be no doubt of club-foot being hereditary, as I have repeatedly met with two or three in a family; in one instance four, and in another six club-feet in one family.

Club-foot has been commonly divided into four varieties, namely, *Talipes Equinus*, when the heel is drawn up, the patient treading upon the ends of the metatarsal bones, the toes being extended forwards, almost at a right angle with the foot; *Talipes Varus*, when the heel is drawn up, the dorsum of the foot turned towards the ground, so that the patient treads on the cuboid bone, the toes being turned inwards towards the malleolus of the other leg, or considerably more backward, with the sole of the foot looking upwards and outwards; *Talipes Valgus*, where the foot is turned very much outwards, the inner ankle approximating the ground; and *Talipes Calcaneus*, where the patient walks on the heel, the anterior part of the foot being elevated by the contraction of the muscles in the anterior part of the leg. There are many cases intermediate between *Talipes equinus* and *varus; equinus* and *valgus;* or *calcaneus* and *valgus*, according to the degree and extent to which certain muscles are contracted.

Of these varieties of Talipes, such as exist at birth are called congenital. I have never yet met with a pure case of single *Talipes equinus* which was congenital, but of all the others I have; and it is remarkable that, whether congenital or non-congenital, that is, arising before or after birth, when only one foot is affected, the right is far more frequently in fault than the left. The cause of the malpositions constituting talipes is evidently the result of spasmodic and paralytic seizures, of which we have ocular demonstration in the non-congenital cases; and no doubt the congenital cases arise from similar causes originating *in utero.* Should this take place at a very early stage of pregnancy, before the bones have acquired much solidity, there of course may be a degree of malformation or twist in them as well as malposition. This, however, is the exception, not the rule.

Different instructions have been given, by different authors, as to what tendons should be divided in each variety; some recommending that only one should be divided, whilst others recommend more; all giving as the result that the cases have ended in the cure of the deformity;—and now I find an American author, Dr Chase, is advocating mechanical extension alone. His cases, published in the January Number of the American Journal of the Medical Sciences, comprise no difficulties. In the first, a case of congenital *Talipes calcaneus*, the patient, who was four weeks old, with the foot capable of being brought to nearly the natural position, by the pressure of the hands, without inducing pain, I have no doubt might have been cured in a very short time by a simple whalebone splint and starched bandage. The second is a congenital varus in a child 2¾ years of age, who had been subjected to mechanical treatment by Dr Chase, when two years old, and which had been continued for about seven months, was abandoned for five or six weeks, when he applied his new apparatus, which reduced the foot to its natural position in thirty-one days. This he calls curing by mechanical means only in thirty-one days, but which to me appears to be the result of mechanical extension for eight months. Case third is an instance of *Talipes equinus* of six years standing, in a patient at 11 years, cured in twenty-one days. The last case I treated similar to this was in a patient at 17 years, whose foot was restored to the natural position in four days after the operation, and I had only occasion to see this patient once more a few days after. Dr Chase's last case, cured in three months, could easily have been restored by the mode I follow, in as many weeks, or sooner. The fourth case is described as very distorted; but its history does not prove it to be one which would offer great resistance to its being restored to its normal position. Nothing can be more deceptive than judging of the difficulty to be encountered, in treating such cases, by the mere appearance, as truly exhibited on paper. Some which appear little displaced may, from the rigidity of the ligaments, cause infinitely more trouble to replace, even after the tendons are divided, than those which appear the most distorted, but are loose, and admit of being moved readily. In children, the worst degree of varus may be restored in ten days or a fortnight; but in some adult cases it may require from one to twelve months, according to circumstances, with the best directed appliances. As I have not picked my cases, but operated on the very worst which presented themselves, even in advanced life, I am enabled to state this fact the more confidently, never having met with an incurable case, where the patient had time and patience to go through the necessary treatment. But those who expect severe cases of varus, in old patients, can be easily restored, will find themselves greatly deceived.

It appears to me, that it is not enough to say that any given method should be adopted, because cases have been cured which have been treated on that plan. The problem to be solved is this. By what means shall we succeed most speedily, most safely, and most certainly, with the smallest amount of pain to the patient, and with the greatest chance of the most perfect and permanent cure ultimately? Having repeatedly tried every mode of treating such cases from the division of a single tendon to that of the whole class of tendons of muscles which could bear upon malposition; (for I have had as many as seven new cases to operate on in one day); I shall briefly state what I consider the best mode, and the reasons upon which I ground my opinion and preference.

In a case of pure *Talipes equinus*, with rigid contraction, it will generally be found that not only is the *tendo Achillis* and *plantaris* implicated, but also the *flexor longus pollicis pedis*, and *flexor longus communis*, *tibialis posticus*, and *peronæus longus* and *brevis*. I am perfectly aware that after dividing the *tendo Achillis* alone, forcible extension will be adequate to bring the foot into its natural position; but I am equally certain that it will be after much longer time has been expended, and much more torture has been endured by the patient, than would have been the case, had the tendons of all the muscles named, or had as many of them as were found rigid, been divided at once. Moreover, I confidently affirm that if the whole are divided, and the foot brought to the natural position within four or five days, (if the operation has been properly performed and the patient a healthy subject), sufficiently firm reunion shall have taken place, to enable the patient to extend the foot by the expiration of that period. I proved this to the satisfaction of my intelligent friend, Mr William Rhind, Surgeon, Edinburgh, in July 1840, when under my care for the cure of his own feet. A boy who had been operated on for congenital *talipes varus* of both feet, and who had the *tendo Achillis*, *tibialis anticus*, and *posticus*, *flexor longus pollicis pedis*, and *flexor longus communis* of each foot divided, had the power of bending and extending the foot, and the great toes, together or separately, when dressed on the fourth day, as witnessed by Mr Rhind, and many others. Since this I have had many opportunities of ascertaining that this was not a solitary instance, as it is a general rule to be expected in the young, and in one or two days more in the oldest on whom I have operated.

I had operated for a hundred and eight cases of club foot before I thought of dividing the *tibialis posticus*, and in some cases the *flexor longus pollicis pedis*, also, in *pes equinus*; but, observing the effect of dividing the *tibialis posticus*, and *flexor longus pollicis pedis* in a case of slight varus, by which the patient was instantly enabled to walk across the floor of my surgery, with his toes out and the soles of his feet flat to the ground, the idea occurred to me, that were they divided as well as the *peronæus longus* and *brevis* in cases of pure *pes equinus*, it would be an improvement. Whoever is familiar with the course of these muscles, from their origins to their insertions, must be at once convinced, as I was; and, if not theoretically satisfied of this, if he will only try both plans in two similar cases, and watch their progress and termination, with an unprejudiced mind, he cannot fail to be a convert to this doctrine. Of course, if any of these muscles are relaxed or paralysed, it would be quite superfluous to divide them; but as they are generally proportionally contracted as the *tendo Achillis*, it is reasonable to infer, that they should be elongated in the same manner as the others; and by doing this the patient is not only saved much suffering during the time of extension, but is in less danger of a relapse than where they have been extended by mechanical force alone. This is the more necessary, as the antagonist muscles are generally in a paralysed or a weak state, and therefore they are less able to resist the tendency of the muscles which have been simply extended, from resuming their original state, on the removal of the mechanical extension.

The wounds being closed with adhesive plaster, the foot and leg should be bandaged as high as the knee, to retain the foot in its original malposition, and prevent the contraction of the muscles, the tendons of which have been divided. Absolute rest and spare diet should also be enjoined for a few days. These remarks are applicable to the operation for every variety. Extension should begin in two days, and in three or four the foot may be easily brought to a right angle with the leg. Where this plan is not adopted, the principal seat of pain will be found to be in the course of these undivided tendons, namely, around the external and internal malleolus and the sole of the foot.

For the same reasons, in cases of varus, I divide at once every tendon which can possibly retain the foot in its malposition, namely, *Achillis*, *tibialis anticus*, *tibialis posticus*, *flexor longus pollicis pedis*, and *flexor longus communis*, and *abductor pollicis*, if required, and should there be much contraction of the sole of the foot, the *plantar fascia* as well as the short flexors. The wounds being closed, and the foot maintained in its original position, in two days extension may be commenced, so as to bring down the heel, and evert and flatten the foot at the same time, with all convenient speed, as far as compatible with the feelings and safety of the patient. The propriety of this will be sufficiently evident from the facts already stated, of the rapidity of the reunion of tendons so divided. The recommendation of treating such cases by dividing the *tibialis anticus* and *posticus*, and *flexor longus pollicis pedis*, only, at first, and making such mechanical appliances as are required to bring the foot into the state of a simple equinus, after which to divide the *tendo Achillis*, and extend, as in this variety, I consider objectionable on three grounds. *First*, it would retard the cure; *second*, it would be apt to cause too much new tendon to be inserted between the divided extremities of the *tibialis anticus*, and thus weaken the power of bending the foot; and *third*, in order to avoid the pain and inconvenience of treating pure equinus by simply dividing the *tendo Achillis*, it would be necessary to divide a second time the *tibialis posticus*, *flexor longus pollicis pedis*, and *flexor longus communis*, as already recommended in the treatment of pure equinus.

In valgus the *peronæus longus* and *brevis* generally require division, and sometimes also the *tendo Achillis*, *peronæus tertius*, and *extensor longus communis*, and *proprius pollicis pedis*. In two days such splints as will produce and maintain necessary extension should be applied.

In calcaneous talipes, the *tibialis anticus*, *extensor proprius pollicis pedis*, *extensor longus digitorum pedis*, and *peronæus tertius*, generally require to be divided. Divide either the whole or as many as seem to bear on maintaining the malposition. In two days apply such mechanical contrivance as may be required to place and maintain the foot in its proper position.

Having restored the foot to its normal position, it is of great importance to ascertain whether the legs are of equal length. In most cases of single talipes, especially in equinus cases, the affected leg is shorter. This difference should be compensated for by a high-heeled boot, or shoe, as the leg may require, otherwise the patient will not only walk with a limp, but there will be a tendency to recurrence of the original malposition.

Having explained the tendons I recommend to be divided in the different varieties of talipes, and the principles upon which I found these recommendations, I shall now state the form of instrument which I prefer, as well as the situation for dividing the tendons named. Although, in the hands of a dexterous surgeon, any instrument may be adequate to perform the operation, still the size and shape of the knife is not altogether a matter of indifference. For adults I use a straight blade one inch and a quarter long and about one-twelfth of an inch broad. The point cut off at an angle of about 60°. This is less apt to transfix and leave any portion of the tendon undivided than the curved and sharp-pointed blades. It is less liable, moreover, to make a counter opening in the integuments. For infants and children a much smaller blade will suffice.

I divide the *tendo Achillis* about an inch and a-half from its insertion in the adult, and proportionally less in younger patients, and prefer cutting from without inwardly; the *tibialis anticus* near its insertion in the *os cuneiforme internum*; the *tibialis posticus* near its insertion in the *os scaphoides*; the *flexor longus pollicis pedis*, and *flexor longus digitorum pedis* at the point of decussation in the sole of the foot, from within outwardly; and from this same wound, the *plantar fascia* also, when necessary. The *peronæus longus* and *brevis* are best divided together above the *malleolus externus*, but separately below it near their points of insertion; the *extensor longus digitorum pedis* before the point of separation into distinct tendons; the *extensor proprius pollicis pedis*, a little more inwardly, and the *peronæus tertius* in the same line or near its insertion, as preferred in the respective cases;—all these latter from within outwardly, the tendons being kept on the stretch whilst divided.

I now come to the principle of extension, and the apparatus by which it may be accomplished. The Stromeyer boards and Scarpa shoes, which have been generally used, are very good in their way, but have been found very inconvenient for general application, owing to their expense, especially in operating amongst the poor; and it therefore became necessary to contrive some plan which would be both effective and cheap. This, I think, I have attained, by the following simple contrivance. The price of a Stromeyer board is L. 2, 10s., besides straps and padding, which cost about 10s. more. A Scarpa shoe sells for L. 2, 10s., their united cost being L. 5, 10s. for each foot. I consider my apparatus is as effective as both, and will not cost more than one shilling for each foot. It consists of a sole piece of hard wood deal about three-eighths of an inch thick, the length of the foot and breadth of the sole at its greatest width, with an edge two inches and a-half deep, to rest upon the inside of the foot, (Plate VIII. Fig. 1.) The two pieces are fastened together with screw nails, and a notch cut in the sole piece a little anterior to the *malleolus externus*, and in the side piece behind the root of the great toe, to allow the bandage the better to embrace the foot and make it lie close to the wooden sandal. This should be covered with sheet wadding or a pad, and to be bound firmly on the foot with a roller, or two or three straps and buckles. A piece of wood from two to three inches wide, and sufficiently long to reach from the foot to a little below the knee, with a notch at the bottom corner, and with an arm extending forwards to about three-quarters the length of the foot, as represented, is now to be made fast to the foot and sole piece, by means of a bandage passing from the front of the leg piece, under and round the sole piece and foot, and then under the posterior notch from without inwardly and over the dorsum of the foot, passing again round the foot and sole piece, and placed at an acute angle with the sole, so that it may have sufficient leverage to elevate the foot when the upright stem is carried back to the side of the leg. An assistant is now to be requested to place a little wadding or pad at the inner edge of the leg piece, and carry it back until it rest against the top of the tibia, the surgeon regulating the extension to what the patient can bear, by allowing the bandage to give way in the meantime, more or less as he judges necessary. He is now to pass the bandage round the foot, ankle, and leg, from the foot upwards, embracing also this lever, with such a degree of tension as he may judge requisite to secure and maintain the necessary degree of extension the case requires and admits of.

To every one at all acquainted with mechanical contrivance, it will at once appear that this is a combination of the lever and inclined plane; and that it is capable of producing any degree of power which is either safe or necessary for effecting the cure of any case to which it may be applied. According to the manner in which it is fixed, it is equally applicable to the extension required in every variety of talipes. The whole should be undone and reapplied once or twice a-day at first, and the foot bathed with spirit lotion; afterwards it may be repeated less frequently. Such are the practical precepts I have been induced to adopt in the cure of talipes from contraction, and having had an opportunity of treating more cases than any individual in the united kingdom, I have no hesitation in recommending them to others, from the great success I have had since their adoption.

In the course of my investigations and practice, I found there was another variety of talipes, of pretty frequent occurrence, which did not arise from preternatural contraction, but from paralysis, or preternatural relaxation of certain classes of muscles, and for which the Stromeyerian operation was inapplicable. I was therefore desirous of discovering a remedy for it, and a very fortunate idea struck me, which has enabled me not only to treat such cases of talipes successfully, but also other affections of a paralytic nature. The idea was this; as cases of contraction were relieved and cured by division and elongation of tendons, might not the relaxed and paralysed muscles be cured by the converse mode, namely, by cutting out a portion of the tendons of such muscles, bringing the divided extremities together, and securing their reunion in that state? It was so strongly impressed upon my mind that this would at least cure the flapping condition of the member, and might, moreover, stimulate the muscles to renewed vitality and contractility, that I resolved to try it. On the 30th of June 1840, assisted by my friend, Mr Rhind, surgeon, Edinburgh, my son, and my apprentice, Mr Pacey.

The patient, six years of age, had been given up as the subject of hopeless paralysis for two years previous, after the failure of the most approved treatment, under able practitioners. The left leg was perfectly powerless, dangling by the side of her crutch, without reaching the ground, much colder than natural, the foot assuming a slight degree of varus, so that when placed on the ground it rested on its outer edge, the heel slightly elevated, and the toes turned a little inwards. I excised 3-16ths of an inch of the *peronæus tertius*, dressed and bandaged so as to maintain the divided extremities in contact. In a week she could walk across the floor with the assistance of holding by my hand, and on the tenth day, in the presence of my talented friend, Dr J. L. Bardsley, and others, she actually walked across my surgery floor, and back again, without any assistance whatever,—a circumstance which equally surprised and delighted him and all present. In twenty days she put on a boot, and in another week walked entirely without the crutch, which she has done ever since. Besides the operation, nothing else was done excepting the use of a stimulating liniment, which she had used before without benefit. The results proved in the highest degree satisfactory.

On the 5th July 1840, in a patient, aged 10 years, I excised one-quarter of an inch of the tendon of the *tibialis posticus* and *flexor longus pollicis pedis*, in a case of valgus from paralysis of these muscles. As in the former case the leg, which had always felt cold before, became warm after the operation. All went on well, and in three weeks, she put on a boot, and walked quite straight

On the 6th July 1840, I operated upon Mrs ———, aged 50 years, who had all her life suffered the annoyance of varus, principally from relaxation of *peronæus longus* and *brevis*. The leg had also been cold. I excised three-eighths of an inch of these tendons, dressed and bandaged so as to maintain the divided extremities in a state of approximation. All went on well; in three days she was able to move her toes for the first time in her life. In three weeks she put on a laced-up-boot with a steel support, by which she was enabled to walk with much more comfort than she had ever done before. From carelessness on the part of the patient, the improvement in this case did not continue so manifest as at first. This may be partly attributed to a slight contraction of the *tendo Achillis*. With the experience I had had, were such a case to occur again, I would divide and lengthen this, whilst I would excise a portion from and shorten the others, as was done, and should thus anticipate a perfect and permanent cure as the result.

Master G——, aged 6½ years, had *talipes valgus* from one year old, arising from absolute paralysis of the *gastrocnemii* and other muscles at the back of the leg. There was not only total inability of extending the foot, but such relaxation of all the extensor muscles, as to allow the foot to be pressed upwards, until its dorsum rested on the tibia. On the 4th September 1840, I excised three-eighths of an inch of the *tendo Achillis*, closed the wound, and bandaged, so as to keep the divided extremities in contact. On the tenth day the wound was nearly closed, and the tendon so firmly united as to resist any attempt at pressing the foot upwards, excepting to a trifling degree, beyond a right angle with the leg. He had also by this time acquired the power of flexing and extending the foot freely, showing that the paralytic state of the extensor muscles was completely overcome. At three weeks from the operation, the patient fell and injured the leg, so as to cause inflammation and suppuration around the newly formed cicatrix, which retarded his recovery. Notwithstanding this, in three months after the operation, this patient was enabled to walk with ease, flexing and extending the foot freely, and capable of maintaining the foot and leg in their proper relative position. Before the operation, any attempt at walking was attended with great awkwardness, the leg being tossed forwards, the toes turned very much outwards, and the inner ankle approximating the ground

Master B——, aged 12½ years, had been much in the same state as the last case for about a year. In October 1840, I excised five-eighths of an inch of the *tendo Achillis*, and dressed and bandaged as usual. On the sixth day the wound was almost entirely closed, and he had the power of bending and extending the foot freely; indicating the reunion of the *tendo Achillis*, as well as the restoration of retractile power in the paralysed muscles. In two months he put on a boot, with which he walked with ease, and can now walk nearly as well as if he had never been so afflicted.

Master M——, aged 10 years, has the right leg quite useless from a parlaytic seizure in infancy. The leg not only powerless, but also cold and withered, being about half the size of the other one; the knee bent to an angle of 45°; the foot turned outwards, and can be easily pressed up against the tibia, showing the extreme want of tone of the *gastrocnemius* and *tibialis posticus.* I excised three-eighths of an inch of the *tendo Achillis*, and about as much of the *tibialis posticus*; dressed and bandaged as usual. All has gone on well; and he is provided with a high soled boot, to compensate for the shortness of his leg. He can now walk without a crutch, merely requiring the assistance of a stick. This leg is much grown, and greatly warmer than before the operation; indeed, he is much stronger altogether.

Miss ——, aged 14 years, has had *Talipes valgo-calcaneus* of the left foot for twelve years from total paralysis of the *gastrocnemii*, with contraction of the *tibialis anticus, extensor proprius pollicis pedis*, and *extensor longus digitorum pedis.* On the 25th of September 1840, I operated by excising a full half-inch of the *tendo Achillis*, and dividing the tendons of the *tibialis anticus, extensor proprius pollicis*, and *extensor longus digitorum pedis.* The wounds were closed with plaster, and splints and bandages applied, so as to maintain the extremities of the *tendo Achillis* in approximation, and those of the other tendons apart. All went on well, and on the sixth day she had the power of bending and extending the foot, showing the reunion of the divided tendons, and restored irritability and contractility to their respective muscles.

W—— B——, Sheffield, aged 7 years, had *talipes valgo-calcaneus* from infancy, supposed to have arisen from a paralytic stroke when six months old. He had no power of the *Gastrocnemii*, so that the foot could be pressed upwards, until it almost reached the tibia. When walking, the foot was turned very much outwards, and the *malleolus internus* nearly touched the ground. On the 26th February 1841, I excised three-sixteenths of an inch of the *tendo Achillis*, and dressed and bandaged in the usual mode for such cases. All went on well, and in six days he could bend and extend the ankle-joint and toes. From this period, he recovered so rapidly, that, in eighteen days from the operation, he could walk easily without any apparatus applied to the foot or leg.

I could easily multiply cases of a similar nature, but shall only add one more, where I excised about half an inch of the tendons of the *biceps flexor cruris*, the *semimembranosus*, the *semitendinosus*, and the *gracilis*, in a case of such extreme weakness of these muscles, that the *tibia* and *fibula* could be so much flexed forwards and upwards on the femur, as to form a very considerable angle at the knee anteriorly. Although both legs were similarly affected, I only operated on one; the left, at first, being much the worst. After the operation, having closed the wounds with plaster, and flexed the legs at right angles with the thigh, splints and bandages were then applied to retain it in that position, so as to allow the divided extremities to reunite with the least possible intervention of new tendinous substance between them. Everything went on to my entire satisfaction; and in ten days, such firm reunion of tendons had taken place, as to offer considerable resistance to extending the leg completely. In two days more, I did not hesitate to let the patient stand on his legs, when it was most interesting to remark the improvement which had resulted from the operation;—this leg being now perfectly straight, the other falling back into the old form. The day fixed for the operation on the second leg, the boy was attacked with scarlatina, which, of course, caused it to be postponed. However, I intend shortly to perform the operation, and have no doubt but the results will be equally satisfactory as those which attended the operation on the first leg.

I have also operated by excising a portion of tendon of the *tibialis anticus*, *extensor proprius pollicis pedis*, and *extensor longus digitorum pedis*, in cases of paralysis of the muscles on the anterior part of the leg, with similar results.

The general inference to be drawn from these and numerous other cases is this, that in about six days, the extremities of tendons from which a portion had been cut, and which were brought and maintained together in the manner named, are sufficiently firmly united to maintain the member in the desired position, and to restore muscular contractility or increased strength to such muscles as are weak, or have been paralysed for many years.

This operation, I believe, is entirely new, and, I hope, will be found an interesting addition to our curative means. I feel convinced it will answer in all such cases as those to which I have referred, if properly managed. It requires considerable care to execute it with that degree of exactness necessary; because, if too little be excised, it will not excite that degree of tone and contractility requisite for insuring sufficient energy; whereas, if too much be removed, it may produce rigid and permanent contraction of these muscles with enervation of the others, which require an entirely opposite mode of treatment.

It is a curious fact that a rigid and permanent contraction of one or two muscles may be sufficient to exhaust the whole nervous and muscular energy of the leg or arm where it occurs, so that there shall be a loss of heat, feeling, and muscular energy of the whole members, all of which may be restored, with so much rapidity, by simply dividing the tendons of the contracted muscles, that it would be no difficult matter to make superstitious people believe that a miracle was performed. Every one who has treated cases of club-foot must have observed the increase of temperature which follows the operation; but, in cases of contraction of the hand, and fingers, and arm, from any contraction of the biceps, long flexors of the wrist and fingers, &c. the division of their tendons have, in many instances, been followed by the most surprising results. Not only have the hands and fingers been set at liberty, but such increased energy restored to the whole arm, that patients of upwards of thirty years of age, who had been deprived of the power of lifting their arms for five or six, or more years, have, in the course of two or three minutes, been able to lift them to their heads. In one case, a patient upwards of 70 years of age, who had paralysis of the right side, and had been dumb for three years, in eight or ten minutes after the operation, was able to lift the arm pretty freely, and the following morning spoke for the first time since his paralytic seizure.

To maintain this advantage, it is necessary, so soon as the cutaneous wounds have closed, to make extension, so as to insure a new portion of tendon growing into the point of separation, otherwise, on the reunion, contraction might be re-established, and with it the original feeble state of the member.

The only physiological reason I can offer, as to the cause of the restoration of power and feeling after these operations, is this. I infer that a certain portion of nervous energy is sent to any member for the general supply of the whole of its functions, and that the quantity necessary to maintain these muscles in this state of morbid tension produces enervation of all the others, with loss of tone, and languid circulation. The operation, by cutting off this profuse expenditure in one channel, allows it to flow for the general benefit of the whole, and hence the muscular power is restored, with freer circulation of blood, which will, of course, produce an increase of heat in the whole member. The operation is also frequently followed with increased vigour of the whole body. This was remarkably evinced in a boy on whom I operated for talipes, from contraction. He was ten years of age, paralytic of the leg, so that he had never had the power either of standing or walking on it, and so weak in his body generally, that he was a most pitiable object, leaning feebly over his crutches, unable to support his head erect. In three weeks after the operation, he was able to walk across the floor by the help of the hands. In a short time longer, he could walk with his crutches, supporting most of his weight on the leg, and supporting the head with ease; and ere long to throw his crutches aside entirely, and walk with a little stick in his hand.

I could easily adduce other instances where weak and withered arms, almost from birth, have thus been restored both to power and increased size; but I fear it might encroach too much on your valuable pages.

Thus, the treatment of these varieties of talipes directed my attention to efficient modes of treating local paralysis, where one class of muscles was in constant rigid contraction; and also to another variety, not with morbid tension of the muscles, but where there was a morbid relaxation of one or more muscles. I found a third variety in which there was a morbid relaxation of the whole member, say a leg or an arm, with wasting of its substance, and it became an interesting inquiry, whether any other method could be devised to meet such cases. It is truly gratifying to be able to say, I have been so successful in this variety by a mode of treatment entirely new. I am actively engaged in investigating this subject, and intend, in due time, to lay it before the profession when I have made some farther observations on the subject. In the meantime, however, I shall give a few of the results, as witnessed by professional gentlemen of high talents, who have examined the patients, in some cases before I saw them, and again, in ten minutes after my application. It has succeeded in cases where the patients have had the benefit of all the most approved appliances which modern science has suggested, including electricity and galvanism; and it is equally successful in infants and children, as in adults, whether male or female.

I had long entertained the idea that the functions of the nerves depended on a subtle fluid circulating within them; and it now occurred to me that friction over the ganglia, and gentle pressure over the course of the nerves leading to the paralysed parts, from their central to their peripheral extremities, might propel a greater quantity of nervous influence into these parts, and thus restore increased energy to them. Moreover, I thought, from the proximity of the arteries, that the same mechanical means would, independently of the increased nervous energy, send a greater quantity of blood along the arteries, and thus also tend to rouse the dormant muscular action. Having formed this theoretical view, I very soon had an opportunity of trying the experiment, and the results exceeded my most sanguine expectation, as a brief notice of the following cases may show. The great sympathy which exists betwixt the muscles and tendons with which they are connected, induced me to apply the same means along their course, especially over the insertion of the tendons of the weakest muscles. Any hard smooth substance will answer the purpose, such as a strong well-made ounce phial.

This is, undoubtedly, a different view of treating such cases from that which avails itself of the aid of mesmerism or animal magnetism; and I believe is entirely new. Whether I am right or wrong in my theory, there is no mistake in the satisfactory results of the practice, as it has been witnessed by many, including professional and scientific gentlemen.

A girl, aged twelve years of age, had been paralytic for seven years, and for the last five the case had been given up as hopeless. The right arm was quite powerless, and the leg so uncertain in its action, that she walked very badly. In ten minutes after my application, she walked much better, could move her fingers, and raise, bend, and extend her arm. In three days, she had a second application. In ten minutes after this, she could walk almost without lameness, and was so much improved in the arm, that she was able to feed herself with it from that time. By a few more applications she was quite restored, and continues now perfectly well.

Mrs ——, the mother of a numerous family, had been paralytic of the right arm and hand for thirteen months. In ten minutes after my application, she was able to grasp firmly with the hand, and move the arm freely, and when she went home the same day, surprised her family by extending her arm, and shaking hands with each of them. A few more applications made her quite well.

—— Had been thirteen months quite powerless in his right hand and arm. In ten minutes, he could move his fingers, swing his arm round his opposite shoulder, and toss it about in all directions. Next day he had still more command over it. The third day he had greater power, and on the fourth, was so much better that he did half a day's work as a labourer; on the fifth day, a whole day's work wheeling a barrow, &c., and has continued to do so daily ever since.

A young lady, 21 years of age, had a paralytic seizure when eleven months old, which left her with her right arm withered, not more than half the size of the other, and cold, and without the least power of motion. The same day I first saw her, she called upon another surgeon, who said she must content herself to remain as she was for life, as he considered her case was entirely hopeless. In ten minutes after my application, she could move her fingers, and throw her arm round her body, and over the opposite shoulder.

I could enumerate many more cases where patients have been unable to move a finger, and who, in ten minutes or less, have regained the power of hand and arm to the extent of being able to lay hold of the rail of a heavy chair, and lift it entirely off the floor.

A case of a gentleman who had paralysis of the left side of the face for six years, who had not the power of closing the eyelids of that eye during that period, regained that power in five minutes, and in an equally short space of time, the nose and mouth, which had been drawn to the opposite side, were made nearly straight.

I shall only add one case more, that of a young man whose case engaged the attention of many of the most accomplished members of the profession, both in Scotland and England. He was a labourer in Edinburgh, and was under two of the most eminent professional gentlemen in that city, on the first appearance of his complaint, but without regaining the power of his arm. He afterwards went into Glasgow Infirmary for some months, but derived no benefit. He then took to hawking for a subsistence, and got into three of the most respectable provincial hospitals in England, and afterwards into three of the London hospitals, but was dismissed from all of them as incurable, after remaining many months in several. He had been afflicted in this manner for about five years and a half. When he called on me last October, the following was his situation. There was the most complete atrophy of the deltoid, biceps and triceps, and, in a considerable degree, of all the other muscles connecting the scapula with the chest on the right side. In short, from the shoulder to the elbow there was nothing visible but the integument covering the bone, and he had not the least power of moving the shoulder, or flexing the elbow. The muscles, from the elbow downwards, were well developed, and he could move the finger and wrist freely. In ten or twelve minutes after my application, he was able to flex his elbow, and raise his arm, and swing it about in all directions. I made him exercise it for some time, which he seemed quite delighted to have the power of doing. He called again the same evening, and was examined by many who were present at the time. He called on me, and had a repetition of the same means several times, and in about ten days left quite vigorous in his arm. There was a slight tendency to the same disease in the other extremities, all of which improved in like manner.

About five months ago I was consulted in the case of Mrs P., aged 42, who had a paralytic seizure four years previously, which deprived her of the power of speech ever since, and rendered her paralytic of the right leg and arm. She had regained a little power of the leg so that she could move from place to place in the room, steadying herself by any thing she could lay hold of with the left hand. She could also with great difficulty make her way into the next cottage door, supporting herself against the wall. In ten minutes after my first manipulations she walked home on her own feet, a distance of fully more than three miles, and continued to walk wonderfully well ever since. The power of the arm was also very much improved, so that she could lift and bend it freely and bend and extend the fingers, whereas she had no power of either before. She also regained the power of speech, so that she could speak tolerably the follo wing day. This case is particularly interesting, from the fact of my having seen the patient only once, and never heard more of her till four months after, when I was attending a young lady in the neighbourhood.

Of course, paralysis arising from organic lesion of the brain or spinal marrow will resist this as well as every other human agency; but I think sufficient has been said to prove that much more can be accomplished for certain varieties of paralysis than has hitherto been thought possible; and it ought to encourage us to still more energetic researches regarding the treatment of this and other intractable complaints.

Since I began this paper, I have operated on 16 more cases of *talipes*, making the total number to the 16th July 1841, 262 cases.

II. STRABISMUS is another disease nearly allied to talipes. It arises from a loss of harmony amongst the muscles of the eye, either from increased energy and ultimate shortening of one or more muscles, which consequently draw the eye in that direction; or from loss of power, or actual paralysis of the antagonizing muscles, which thus permit those in the normal state to draw the eye into an unnatural position, in the direction of the healthy muscles. The cure consists in the division of the tendons of the muscles which are acting too vigorously, or are contracted, and allowing the other muscles to draw the eye into the normal position; and the divided tendon thus forms a new point of adhesion, further back in the sclerotic coat than originally, which thus weakens the power of the muscle, and prevents it drawing the eye into the former malposition.

As there are now several excellent monographs, as well as papers published in various periodicals, on strabismus, I shall confine my remarks chiefly to the relative frequency of the affection in the right and left eye of the two sexes, and my mode of operating, which my extensive practice in this department has enabled me to reduce to the utmost simplicity to which it is capable of being reduced. For some time my average number of operations for squinting was from ten to eighteen daily; in all, nearly seven hundred cases; an extent of practice well calculated to give dexterity in the performance of an operation, which, although in itself simple, still required considerable tact to enable a person to perform it with neatness, certainty, celerity, and ease to the patient. A scientific friend, who is a close observer of all he sees, being one day in my surgery, had noted the time occupied in operating on six patients in succession, without making me aware of the fact. The whole time occupied for causing the patients sit down in succession on the operating chair, applying the specula, securing and dividing the tendons, sponging the eyes, folding and applying pledgets over the eyes, securing them in that position by bandages pinned round and over the head, giving instructions for the use of the lotions, occupied for the six patients was thirteen minutes and a half.

All the instruments I use are a pair of spring specula for keeping the eyelids apart; a blunt hook for pinching up and separating the parts to be divided; and a pair of sharp curved scissors. The speculum for the under eyelid has a curved watch-spring sufficiently long to embrace and press against the base of the lower jaw, and that for the upper, a spring of the same sort, sufficiently long to pass over and press against the back of the head. They give no pain to the patient, and uncover the eye more effectually, and are less in the way than the fingers of an assistant. They farther enable the operator to dispense with the aid of an assistant. The scissors I prefer are of the same size and shape as those commonly carried in a pocket case; the blades very sharp; the lower one the smaller of the two, and a little probe-pointed. A chair, with the seat a foot from the ground, with a stuffed back two feet and a half high, is what I use in my surgery. It is more convenient and steady, than resting the patient's head against an assistant.

The following is the plan I have uniformly followed in performing the last 400 operations. The patient being seated, his head resting against the back of the chair, I apply the specula. Supposing it to be an internal squint, I desire the patient to look outwards, and with the hook held in the right hand, in the same manner as a writing pen, I pinch up a fold of the conjunctiva and tendon at same time, a little anterior to the *caruncula lachrymalis*, transfer the hook to the left hand, and then with a snip or two of the scissors divide the conjunctiva, tendon, cellular tissue, and fascia together, a little anterior to the point of the hook. In securing the tendon, the hook should be held at an acute angle to the axis of the eye, and the point passed from above downwards, and when transferred to the left hand, should be held a little across the nose, the point still downwards, whilst the scissors are used. The parts being divided, the hook should be passed freely round, and for some depth between the tendon and sclerotic coat, to separate all adhesions, which may exist betwixt them. If there are any which offer much resistance, let them be elevated by the hook and divided by the scissors. The securing and dividing the tendon, &c. in the way I have described, ought not generally to occupy more than from a quarter to half a minute. The specula are now removed, and the eye sponged with tepid water, when it will be observed to have assumed a central position, or perhaps a slight external squint. I next apply a few folds of calico dipt in cold water, over the eye, which is retained in that situation by a narrow calico bandage passed round and over the head. A weak solution of sulphate of zinc occasionally applied over the bandage and pledget is the whole treatment generally required.

In healthy subjects, lymph will be thrown out in twenty-four hours sufficient to conceal the sclerotic coat from view. Care should be taken to regulate the position of the eye during cicatrization; and if there is the slightest tendency to a return of the maldirection, the patient should be requested to look outwards, whilst the surgeon makes such pressure with the point of a finger over the eyelids as shall be sufficient to sever the new adhesions, and press them backwards, so as to secure their adhesion to the sclerotic coat so much farther back as required to procure such balance amongst the antagonizing muscles as will insure a correct position to the eye ultimately. I attribute much of my success to attention to this point. Occasionally, however, owing to weakness of the antagonizing muscle, after adhesion has taken place, the squint returns, although in a less degree. In such cases, unless when there has been absolute paralysis of the antagonist muscles, I have found a resection of the tendon, and, taking care it forms its adhesion still farther back, has been sufficient to remove the defect. If this is not the case, however, the division of the internal rectus of the other eye should be effected, as the probability is the fault lies there.

Having had so much success, in so many cases, by dividing a single muscle, with all its adhesions to the sclerotic coat, I was much surprised to find lately that a Parisian surgeon, M. Baudens, who has operated in about the same number of cases as myself—about 700—should state that he has found it necessary to divide two, three, and even four muscles,—the latter number in every twenty-five or thirty cases. Excepting in two or three cases, arising from absolute paralysis, which occurred before I saw his paper, I have met with none which did not make a very near approximation to a perfect cure, by my simple but careful mode of operating; and the day after I read his paper two cases occurred, which, according to his statements, should have required the division of two or three muscles. I particularly called the attention of my son and the other gentlemen in my surgery to these cases, which I confidently predicted would be amenable to the division of one tendon, with all adventitious adhesions betwixt it and the sclerotic. My anticipations were fully realised in both instances, and others which have occurred since. However, I should remark, that, in such cases, I make the incision in a crescentic form, the horns pointing backwards, which admits of freer retraction of the tendon and conjunctiva.

*Strabismus divergens* I have treated by securing and dividing the tendon of the external rectus in a similar manner as the internal. In some cases of this sort the operation has been followed by a perfect cure, but in most it has only meliorated the squint. In all cases, excepting two, of external squint, arising from division of the *rectus internus* for *strabismus convergens*, the division of the external rectus has been followed by a satisfactory result. How far such imperfect cures of original external squint might have been meliorated by division of other muscles, I am not prepared to say, not having tried the experiment.

In pinching up the tendon, the hook should be held at an acute angle to the axis of the eye, the point pressed downwards and forwards, with sufficient firmness to pinch up a fold of tendon and conjunctiva, without penetrating them, or by too much tenderness allowing the conjunctiva to be dragged over the sclerotic, by which it might be torn. It requires a nack to do this, but is so valuable when acquired, as to deserve any trouble required to attain it. The point at which I apply my hook renders it more easy than would be the case midway between the cornea and caruncula. As generally recommended, I apply it farther back, where, of course, it is looser and less likely to injure the sclerotic at the point of attachment. This I decided on in my own mind by operating on the dead subject prior to and after operating on the living. For beginners it may be as well to pinch up a fold of conjunctiva with a pair of forceps, and with a single snap of the scissors expose the tendon before applying the hook to elevate it, which should now be done, and the operation finished as before described. Such was the plan I adopted myself at first.

In cases combined with cataract, I operate for the cataract first and then for the strabismus; but when complicated with ptosis, I operate for the squint first, and for the ptosis after.

According to my experience no consecutive inflammation worth naming is to be apprehended, unless from the grossest imprudence on the part of the patients. Most of my patients have never lost an hour's attention to business or amusement in consequence of the operation. They are generally well in two or three weeks, no visible trace of the operation being left excepting a linear cicatrix, visible only on close inspection; and the sight is generally improved. Occasionally granulations spring up in the site of the incision, the best mode of removing which is to snip the pedicle across with the strabismus scissors. This is attended with very little pain. They sometimes require to be removed a second time, but seldom oftener. In a few cases in scrofulous habits, with tendency to erysipelatous inflammation, I have applied the nitrate of silver with advantage.

As I consider it a duty to report unfavourable as well as favourable cases, I shall report two which occurred to me. One was a case of double internal squint, and both were operated on very satisfactorily. In about a month after the last, the eye which squinted worst at first acquired a slight tendency to its old position. In compliance with the patient's particular desire, I operated on that eye a second time, which I had done so often before with safety and success, as he had seen. There was no particular difficulty in performing the operation, nor pain attending it. The following day, however, he complained of more pain than on the former occasion, which I attributed to cold caught when he went home after the operation, and I prescribed accordingly. The following day he called on me, complained of headach and pain in the eye, and was feverish. He was bled and purged freely, and desired to let me know if he was not better next day, in the event of which I promised to visit him at home. No message came, so I presumed he was better, and therefore did not see him. The following afternoon it was intimated to me that he was very ill from pain and swelling in his face and neck. When I saw him he was quite intelligent; complained of pain in the eye, face, and neck; in short, he was suffering from an attack of erysipelas, which, at the time, was epidemic here. He could see distinctly, and answer every question correctly. The following morning he died suddenly, I have no doubt, from the erysipelatous affection extending and producing *œdema glottidis*.

The other was a girl 17 years old, of a strumous habit, who had internal squint of the right eye, induced by a severe inflammation of the internal structures of the eye, which took place nine years before. The cornea and lens were in tact, but she could barely distinguish light from darkness. I told her an operation might improve the position and external appearance of the eye, but could not restore vision. With this understanding she wished the operation to be performed, which was done in the usual manner. There was nothing remarkable either in the operation or after it, only there was a tardiness, in the effusion of lymph for cementing the divided parts, and covering the exposed sclerotic. There was also a more protracted state of the whole process of healing, and an unusual persistence of slight inflammatory appearance in the conjunctiva, but attended with no particular pain. At the end of three weeks she disappeared for more than a month, when she returned, stating she had been applying any thing to her eye she thought might benefit it, and that lately the pain had become much worse. On examining the eye I immediately discovered she had been suffering from choroiditis, which, being unchecked, had induced slight *staphyloma sclerotica* with an external squint, and vision was extinct. After submitting to the treatment I proposed for two weeks, she became impatient, and disappeared for about another fortnight. She then returned with a friend to apologise for her conduct, stating she had, in the meantime, been under the care of the officers of a public institution, who held a consultation, and decided that the eye must be sunk. The opinion had also been expressed in her hearing, that the cause of all this was my having cut wrong parts in my first operation on the eye—namely, that I had cut through the sclerotica. As my mode of operating had been published in the Medical Gazette some time before, such an opinion was most unfair, as it must have been known; and whoever had perused the paper must have been aware that, in my mode of operating, such an accident was impossible, unless the operator did it on purpose. The patient did not like the proposal of having her eye sunk, and begged hard for me to take her again under my care. I did so, and immediately excised a portion of her attenuated and diseased sclerotic and choroid coats, evacuated the aqueous humour, and used the necessary means to subdue inflammation of the internal structures of the eye. The result was, that, in about five weeks, the girl was able to go to work in a warehouse, where she has been employed ever since. The staphyloma is gone; the eye the normal size; and when she is looking straight forward free from squint.

The case is interesting in many points of view. The rationale is evidently this, that the slight inflammation commonly following the operation for strabismus had been sufficient to rouse into action inflammation of the choroid, which had sustained so much damage nine years previously, and being neglected and allowed to run its course unchecked during the time she absented herself from me, it had attained the state reported above described, when she returned. It should, therefore, act as a caution against interfering with an eye rashly for mere appearance sake, when the patient is of a highly strumous habit, and has suffered severely from inflammation of the internal coats of the eye. This patient has been seen by several members of the profession, who can bear testimony to the facts now stated.

I am well aware that all are not so candid in stating unfavourable cases, but such are fully as instructive as the most fortunate. I have had many applying to me, after such operations by others who were reported cured, but who were worse than before the operation. I had three with external squint, subsequent to the operation for *strabismus convergens*, within the last five weeks, which had been published as cured. In one, the external half of the eye was amaurotic, and nature had evidently induced the internal squint, to enable him to see by the images of objects being made to fall on the sensitive part of the retina. The operation, however, had frustrated the intention of nature, and now that it was an external squint, the eye was totally useless, as the images of objects could only fall on the insensible part of the retina. I operated and restored the eye to the central position, and this rendered the eye partially useful, with which the patient is now quite content.

It is a remarkable circumstance, in a statistical point of view, that, on the whole, there seems to be an equal tendency to strabismus in both sexes, but that there is a much greater inclination to affection of the left in men than in women. Thus, on the whole, the left eye is affected more frequently than the right, in the proportion of seven to six, and the right being affected about equally as the left in women. This difference is solely attributed to the greater tendency to affection of the left eye in the male. Single squints comprise about ninety, the double ten per cent. External squints do not amount to more than four per cent.

In cases of double squint, I prefer operating on the worst eye first, and allow that to get well before operating on the other. The patient is thus enabled constantly to attend to his avocations or amusements, and in some cases the second eye gets well without operation.

It has been frequently remarked that the sight of the squinting eye is the weakest. This accords with my own experience; but I have met with none who have taken notice of the curious fact, that every one has one eye so much stronger than the other, that objects are seen distinctly by only one eye, the other heightening the objective impression, or perhaps giving the angle of direction by which we estimate distance. The right eye is the one for distinct observation in the majority of instances, but by no means so in all individuals. Whether this arises from habit or some original difference of impressibility, it is no doubt the cause why we see singly whilst we have the image of an object painted in each eye. I have not time to enter into the discussion of this curious subject at present, but shall probably do so in a future number. In the meantime I shall refer to a very simple experiment, by which any one can easily convince himself of the fact. Look stedfastly at any object, whether near or at a distance, till you observe it most distinctly, as you imagine, with both eyes, bring any object, such as a pencil held vertically, at arms length, in a line between the eyes and the object looked at, close one eye, the other still looking in the same direction. If the stronger eye, and of course the eye of observation, is closed, the distant object will be seen not in a line with the intercepting object but to one side; but if the weaker eye is closed the two objects will appear in the same line. This may be repeated any number of times, opening one eye and shutting the other, with the same results, whatever eye is first closed; provided the original direction of the eyes and intervening object are not altered in the meantime.

III. STAMMERING is another infirmity which has recently been discovered to be amenable to surgical treatment. Dieffenbach and Yearsly have been represented as the first who have devised and practised effective operations for the cure of stuttering. But, whatever merit is due to any one in that respect, I have an undoubted right to claim for myself; having operated for that complaint by division of the *frænum linguae* and *genioglossi* muscles; and in other cases by excision of the tonsils and amputation of the uvula three months prior to either of them. This has been established by documents published in the Medical Gazette;—Professor Dieffenbach's first operation having been performed on the 7th January last, Mr Yearsly's in December, and mine in September, 1840. Up to that period I had considered stammering to be a nervous affection or an acquired habit, to be overcome by medical treatment, or great care and attention in the use of the vocal organs. Having found so many other repeatedly incurable complaints to be amenable to surgical treatment, I was led to examine some cases of extreme stammering, which presented themselves to me at that period, with the view of ascertaining whether they might not arise from some physical cause, capable of being relieved by surgical operation. I soon discovered they were associated with a rigid state or bridling of the tongue, which I considered would interfere with the free opening of the glottis, which would prevent that free transmission of air necessary to insure prompt and correct enunciation, and the division of the frœnum, including part of the *genioglossi* muscles, occurred to me as the most natural and ready mode of relieving this state. I immediately operated accordingly, and with the most satisfactory results, as the patients, who could scarcely utter a single word without the greatest difficulty, could instantly speak with ease and freedom. This having been done whilst my surgery was crowded with patients, their report of what they had seen and heard, induced others so affected to apply to me, so that I have had two, three, or four such patients sitting down to be operated on in succession. I may safely say I have operated for more stammerers than I believed could have been found in this town and neighbourhood. Some cases I considered to depend upon obstruction or free opening of the glottis, arising from the pressure of enlarged tonsils; others from an enlarged and trailing uvula irritating the epiglottis, and thus producing the same effect from different causes. The cure of the former I attempted, and successfully so, by excising a portion of the enlarged tonsils with an instrument I have for the purpose, which does it neatly in a few seconds, and with very little pain; the other by seizing the uvula by means of a pair of forceps, and excising the whole or a part, as may be judged necessary; such operations have generally been followed by an entire cure; others have been only partial; and a few have proved incurable by any other means.

It is curious that so many methods have been proposed for the cure of this affection, and that it has been treated successfully by so many different modes. In some cases, besides the section o the frænum and *genioglossi* immediately under the ranine arteries I made a farther section immediately behind the symphysis of the jaw. In some cases from a distance, in which I had not an opportunity of watching the progress of the cure, so soon as the parts had reunited in the old position, became as bad stammerers as ever; but a resection of the parts, with attention to guard against this, had the same effect as the first, of instantly curing the stutter, and they have now continued perfectly well so long, that I have no doubt of the cures being permanent. In other cases of this sort, however, the stammering has returned after a lapse of time.

In performing this operation I use the same scissors which I have employed in the operation for strabismus.

My operations have never been followed by hæmorrhage to any extent excepting in one patient. He did not lose one ounce of blood whilst in my surgery; had no vessel divided which threw out a jet or continuous stream of blood, and required no application whatever to arrest the trifling discharge from the muscular fibres divided. Strange to say, in two hours after, hæmorrhage commenced, and when he had got nineteen miles homewards, which he accomplished on horseback, he had become very much exhausted; and the professional gentleman called in had great difficulty in arresting the hæmorrhage.

In one case I divided also the hyoglossus. Although most cases will be ameliorated, if not entirely cured by the mode of operating I have adopted, I am now satisfied there are others which will not yield to either of them.

IV. Spinal Curvature, treated by division of the muscles of the back after the example of Guerin, is another interesting operation. By proper selection of cases, and judicious after treatment, I feel assured it will prove a great boon to those so afflicted. With the exception of one case by Dr Laycock, I was the first to perform this operation in England, and have now done so in twenty-one cases, with results which have been most gratifying. All have been greatly improved, several perfectly cured. One young lady, who had suffered from it for eleven years, and for the last six had been compelled to wear a steel helmet to support her head, in two weeks from the operation, sat up without such aid, and has continued able to dispense with this cumbersome and unpleasant companion ever since.

As there is a difference of opinion as to the primary cure, and the proper site for operating in such cases, I intended to have given you a few cases illustrative of my views on this subject. I have both positive and negative proof to adduce in support of my views; but this paper has already extended to too great a length, and must therefore reserve them for another number, or a pamphlet on this interesting affection; which it is my intention very shortly.

I am quite satisfied that, in recent cases, before the ribs have been much affected, the operation will be adequate to effect a cure of itself; but in cases of long standing, with great distortion, it will only prove a principal auxiliary to appropriate mechanical and physiological treatment.

It is of great consequence for the success of the operation that right notions should be entertained as to the proper place to make the section of the muscles. The only case in which I operated contrary to my own judgment, in deference to the opinion of one who had published on the subject, was a complete failure. At the end of seven weeks the young lady was about as bad as ever. I then proposed another operation on my own plan, and in six days after, the patient was nearly straight, as can be certified by those who witnessed the operation, and assisted in taking the outline of the spinal curve before the operation, and again in five days after.

Another case I operated for about the same time. A young lady with a single curve, verging fully an inch from the perpendicular, went perfectly straight of its own accord, the moment I divided the contracted muscles. She was walking out in ten days, quite straight, without having required my mechanical appliances. The operation does not occupy more than half-a-minute in performing it; and has not been attended with serious constitutional irritation in any of the cases which have fallen under my care.

I have operated on 23 cases of spinal curvature previous to the 16th July 1841.

V. In severe cases of what is commonly called knock-knee, I divide the tendon of the biceps, the *fascia lata*, and *vastus externus*, a little above the joint, on the subcutaneous section method; close the wound with plaster, apply a bandage to keep the leg steady; enjoin absolute rest and spare diet for a few days. On the fourth or fifth day, according to circumstances, I apply a splint to the outside of the leg, extending from the *trochanter major* to a little above the *malleolus externus*, and place a pad under each end to protect the soft parts. A bandage is now to be applied, embracing the leg and splint as tight as the patient can bear, which very soon restores the leg to the straight state. The bandage should be removed and replaced once or twice a-day at first; or a soft elastic strop, such as woollen girth web, may be carried round the knee and splint, and the tension regulated as required, either by a buckle or a screw applied for the purpose on the outside of the splint, as preferred.

For the rectification of the deformity called bandy legs, which is the converse of the preceding variety, I divide the tendons of the *semi-membranosus*, *semi-tendinosus*, *gracilis* and *sartorius*, and apply the splints on the inside of the leg. Such cases can be greatly improved in this way, but not so much so as the other variety, from being generally associated with a considerable curvature of the tibia and fibula.

If either of these varieties is associated with a degree of flexion of the knees, both outer and inner ham-strings require to be divided at once. When the first leg is nearly well, the other may be operated on in like manner, if the deformity is such as to require it.

It sometimes happens that the one leg is twisted outwards, whilst the other is twisted inwards. In such cases each leg must be treated accordingly.

For some time after the legs are straight, and the extension splints are removed, they should be supported by steel supports, with joints to admit of flexion and extension of the knees.

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## ART. IV.—*On some Diseases in which Albuminous Urine occurs.*

By THOMAS WILLIAMSON, M. D., one of the Physicians to the Leith Dispensary, &c. &c.

SINCE the promulgation of the views entertained by Dr Bright and others, in reference to the urine containing albumen in certain diseased conditions of the kidney, members of the profession in general have willingly given their assent to this doctrine. But whilst, on the one hand, it cannot be denied that Dr Bright, by his researches, threw light upon much that was formerly obscure, on the other, it may fairly be questioned whether the medical profession are not disposed to attach too much importance to the simple appearance of an adventitious principle in the renal secretion, as pathognomonic of structural change in the kidney. It is my object, then, in the present communication, to inquire whether there are diseases, apart from change in the renal structure, in connection with which albumen is contained in the urine, and by this means attempt to show that this phenomenon is not of such rare occurrence as is perhaps generally believed.

Although Dr Bright, doubtless, is entitled to the merit of being the first to proclaim to the medical world, the fact of renal disease, co-existing with an altered constitution of the urine and dropsy, as mere symptoms of the primary renal change of structure, yet the existence of albumen in the urine of certain patients labouring under dropsy was made known in the year 1764, by Cotunnius, who, adverting to this phenomenon, as occurring in a young man affected with anasarca, to whom he gave cream of tartar, and increased by this means the flow of urine, says, " nam duabus libris ejus urinæ ad ignem admotis cum pene dimidium evaporasset, reliquum facessit *albam in massam*, jam coacto ovi albumine persimilem."* Again, in the year 1770, we find Dr Fordyce stating, that, " if the kidneys are relaxed or stimulated, chyle, serum, coagulable lymph, and even the red part of the blood may be thrown out."† Dr Darwin, in 1794, states, " there is a third species of diabetes, in which the urine is macilaginous, and appears ropy when pouring it from one vessel into another, and will sometimes coagulate over the fire."‡ In 1798, Rollo thus writes, " nitrous acid added to healthy urine produces slight effervescence, and gives it more or less of a reddish colour, but produces no precipitation. In some diseases, however, particularly general dropsy, or anasarca, this reagent, when dropped into the urine, produces a milkiness, and in some instances, a coagulation similar to what would take place if added to the serum of the blood;" and again, " in morbid states of the urine, the coagulable part of the serum is detected both by the nitrous acid and even by heat."§ In 1811, Blackall, ‖ Cruickshanks, ¶ and Nysten detected the same phenomenon. The latter says that he examined the urine of a young man labouring under acute peritonitis, under which he died ; and among the other substances discovered, he states that it contained " a large amount of albuminous matter, which the urine does not contain in a state of health." Talking of the urine belonging to dropsical patients, he states that he procured some from a young man, 18 years of age, who had been affected with ascites for several months, to all appearance idiopathic; and among the other substances detected by chemical analysis, he adds, " as regards the great quantity of albumen found in this urine, it will be necessary to analyse, and support them by the examination of dead bodies, in order to determine if the dropsy had any share in its development, or if it was dependent upon a particular state of the urinary organs." He also, alluding to peritonitic urine, says, that " it contained much albumen, which leads to the supposition that the urine becomes albuminous in peritonitis." ** In 1812, Dr Wells †† likewise directed attention to the appearance of albumen in the urinary secretion.

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* Cotunnius de Ischiade Nervosa Neapoli, 1764, republished in Thesaur. Sandifort, p. 417.

† Fordyce's Elements of Practice of Physic, 1770, p. 18.

‡ Darwin's Zoonomia, 1794, Vol. i. p. 316.

§ Rollo on Diabetes, 1798, pp. 443–446.

‖ Blackall on Dropsies, 1811.

¶ Ibidem, (see Appendix.)

** Nysten, Recherches de Physiologie, 1811, p. 255, 260, and 262.

†† Transact. of a Society for the improvement of Med. and Chir. Knowledge, Vol. iii. p. 167. London, 1812.

Previous to bringing forward cases for the purpose of proving the frequent existence of albumen in the renal secretion, altogether independent of any change of structure occurring in the kidney, it may, perhaps, be well shortly to advert to the opinions expressed by various authors of eminence as to the extreme rarity of its occurrence. Dr Osborne states in connection with this subject, " in no instance have I met with coagulable urine without diseased kidneys, or healthy kidneys with coagulable urine." Dr Christison states, that, although coagulable urine may be found without kidney disease, it is, nevertheless, " very rare." M. Rayer is said to have examined the urine of 400 patients taken indiscriminately, the result of which was, that only three presented albuminous urine without granular kidney. M. Solon examined the urine of 500 or 600 persons either in health or full convalescence, and found only one with albuminous urine. And lastly, Professor Forget, on two different occasions, examined the urine of between 40 and 50 patients in his hospital, and " found albuminous urine only in those affected with dropsy, and in whom, when they did not recover, the inspection proved the existence of diseased kidneys."*

On the other hand, among those who strongly contend for the frequent appearance of albuminous urine without kidney disease, we may mention the name of Dr Darwall, who illustrates his position by several cases, one or two of which we now call attention to. Talking of effusions which frequently attend diseased states of the heart, he observes:

Case I.—In a patient who died in the Birmingham Hospital, during the present year, at a very early stage of the effusion, two months before his death the urine was barely rendered turbid, but the evening he died it was nearly rendered solid by boiling. On dissection, the heart was found enormously enlarged, and the aorta very much diseased, the kidneys were perfectly sound."

Case II.—Another case " occurred in a lady who had been suffering from pulmonary symptoms, and symptoms of disease of the heart for nine months. When we first saw her, at this time, the urine coagulated strongly, and continued to do so till the period of her death, three months afterwards; yet, while the left lung, the pleura, and the heart, exhibited serious disease of long standing, and while the liver was also diseased, though in a slighter degree, there was no appreciable change whatever in the substance of the kidneys."†

The three following are cases of pneumonia, and occurred in our own experience.

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* See Christison on the " Granular Kidney," page 39.

† Cyclopædia of Practical Medicine, Vol. i. Article " Dropsy," p. 637 and 640.

Case III.—John Guy, aged 25, a stout, sober, and healthy young man, by occupation a seaman, after having been exposed to cold, was seized with rigors, which were shortly afterwards followed with dyspnœa, cough, and copious rusty-coloured expectoration; crepitating rale heard all over the right side; passed about a pint of urine in the twenty-four hours, of a dark straw-colour, specific gravity 1012. In this case, nitric acid gave an albuminous precipitate to the extent of nearly one-half of the volume of fluid employed, which precipitate withstood the action of heat. This occurred at an early period of reaction. The young man subsequently recovered.

Case IV.—Alexander Ballingar, an old soldier, aged 68, stated that he enjoyed during his life the best of health, with the exception of a severe inflammation of the chest, which was brought on by lying three days and nights on the field of Waterloo, after having been wounded in that engagement. He had been ten days ill with dyspnœa, cough, and coloured expectoration before seen by me, at which time all these symptoms continued. In addition, the right side of chest upon percussion gave a sound as dull as that emitted by marble; percussion on left side tolerably natural; bronchial respiration and bronchophony were heard distinctly all over the right side, while mucous râles, with puerile respiration, were present in the left side of chest; passed about a pint of urine in the twenty-four hours, of the colour of small beer, specific gravity 1022, which yielded no precipitate by heat alone. After the addition, however, of a little nitric acid, a copious albuminous precipitate was the result, which effectually withstood the reapplication of heat, showing that the urine had been previously alkaline. This man died.

Upon dissection, the whole of the right lung was found to be in the state of gray hepatization, with extensive old cellular adhesions between the *pleura costalis* and *pulmonalis* of both sides; the left lung was in a state of active congestion. The kidneys and other organs were perfectly healthy. This man, it should have been stated, was a drunkard.

Case V.—John Gray, aged 45, by profession formerly a soldier, had fought at Waterloo, and died the same day as the preceding case, labouring under all the symptoms of pleuropneumonia. Upon dissection, recent bands of lymph were found passing between the *pleura costalis* and *pulmonalis* of the right side, with some serous effusion into the corresponding pleural sac. Right lung in a state of red hepatization, with small portions here and there having passed on to the gray, slight effusion into the pericardial cavity, with soft lymph between its serous coats. Kidneys perfectly healthy to all appearance, though rather pale in colour; both structures, however, quite distinct. Passed before death about 18 ounces of pale-coloured urine daily. Specific gravity 1012; heat and nitric acid gave an abundant precipitate of albumen.

Most of the following cases came under my own direct observation.

Case VI.—Mrs Ross, aged 63, of sober and temperate habits, before death had for some years been affected with all the symptoms of scirrhus of the pyloric extremity of the stomach, such as, almost constant pain, anorexia, and frequent vomiting of a dark-coloured fluid, somewhat similar to coffee grounds. Upon dissection, the pyloric extremity of the stomach was thickened and hardened, which arose from its cellular tissue having become hypertrophied. Kidneys perfectly healthy, as were all the other abdominal organs. The lungs were loaded with frothy mucus. Left ventricle of heart in a state of hypertrophy without dilatation; its other cavities were perfectly healthy and natural; the two serous surfaces of the pericardium were universally adherent, by means of old cellular bands. During life there was nothing remarkable in respect of the renal secretion, as regarded quantity. Then, it was not examined. After death, however, the quantity of urine obtained from the bladder, though too limited to enable us to ascertain its specific gravity, nevertheless, by the agency both of heat and nitric acid, afforded an albuminous precipitate almost equal in volume to the quantity of fluid employed.*

Case VII.—Mrs W. for three years before death had laboured under symptoms of diseased stomach. Upon dissection, the pyloric extremity of the stomach was found in a well-marked state of what is usually denominated scirrhus of the stomach. All the other abdominal organs were healthy. Unfortunately, however, the kidneys were not minutely examined, so that we are unable to bring forward any positive evidence as to their natural or healthy state. We have, however, thought this case worth inserting along with the preceding one of scirrhus of the stomach, more especially as the urine which was obtained from the bladder was highly albuminous.

Case VIII.—J. A., 73 years of age, had been the subject of retention of urine for the last ten or twelve days of his life, seemingly dependent upon a paralyzed state of the bladder. The urine was secreted in considerable abundance, and was of a dark greenish colour; specific gravity 1022. This urine contained a large quantity of albumen. Upon dissection the left kidney was very small and atrophied, containing a considerable sized calculus within its pelvis. The parenchymatous tissue of this kidney was almost entirely converted into serous cysts. A smaller calculus, of a peculiar flat button shape, was contained in one of those cysts at the upper part of this kidney. The right kidney was in a state of hypertrophy, but otherwise healthy. The urinary bladder was large, and immensely hypertrophied in all its coats; its inner or mucous coat was rough and granular, several small calculi were found in the urethral portion of the prostate gland, which gland itself was much increased in size.

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* In many of the succeeding cases, it will be observed, that the urine was submitted to chemical examination after the death of the patients. Now, though I am aware that on this account objections may be urged against the validity of such cases, on the ground of the serum of the blood exuding through the tissues of the bladder after death, and consequently mingling with the urine therein contained, nevertheless, as from experiment I know this to be by no means a phenomenon of universal occurrence, I think it but right to record these cases in conjunction with others.

Some writers upon the granular kidney, in establishing the existence of albumen in the renal secretion, as one of the pathognomonic symptoms most to be relied on for pointing out the disease, deny, that, whilst the renal tissue remains unaltered, any organic lesion of the liver is capable of producing the phenomenon in question. It will be seen, by referring to a few cases which follow, that albumen was detected in the urine of individuals, in whom the tissue of the liver was, upon dissection, found to deviate from its normal condition, and to have assumed that peculiar appearance known by the term cirrhosis. Little value may, perhaps, however, be attached to such cases, seeing that it has been doubted by able authority whether this seeming change of structure be really an accidental deposit. I have, notwithstanding, thought them worth recording.

Case IX.—A Prussian sailor fell by accident into the hold of his vessel. Immediately afterwards he was brought to the Casualty Hospital (Leith), when it was found that he had sustained a severe fracture of the cranium. He died in a few hours after admission, with symptoms of compression of the brain. Upon dissection, a large coagulum was found between the inner table of the scull and *dura mater*. The corresponding or left cerebral hemisphere was much compressed, and partially lacerated. The liver was large, and contained many large patches affected with cirrhosis. The spleen was soft, and the kidneys perfectly healthy. The urine was pale and colourless; specific gravity, 1016. When exposed to heat or nitric acid an abundant precipitate of albumen was the result. This man was uncommonly powerful, 30 years of age, and in the full enjoyment of health both previous to and at the time of the accident.

Case X.—J. Robertson, aged 30 years, a stout muscular porter, of intemperate habits, was seized with all the ordinary symptoms of *delirium tremens*, from which he died.

Upon dissection, the traces of general cerebral congestion were apparent, without, however, any of the prominent effects of inflammatory action. Considerable serous effusion was found between the arachnoid membrane and *pia mater*, as also at the base of the cranium. The two serous surfaces of the pericardium were universally adherent, by old cellular tissue. The left ventricle of heart was hypertrophied, without much dilatation. A ring of osseous deposit was found surrounding the mitral valve.

The liver was about its natural size, but much affected with cirrhosis. The kidneys were perfectly healthy. The urine was of a dark straw-colour; specific gravity, 1018. Heat and nitric acid gave an albuminous precipitate, equal in volume to perhaps a fourth of the fluid employed.

Dr Blackall gives an instance of albuminous urine co-existing with diseased liver, which we shall here abridge.

Case XI.—A. B. aged 45, sallow and bloated skin; pulse 100, hard; dyspnœa; loss of voice, and stricture about the hypochondria; abdomen swelled; frequent dark bilious discharges; œdema of legs; urine of the appearance and colour of rennet whey, copious at night, precipitating at 160; convulsions shortly came on, with fixed but not dilated pupils. Blood drawn was watery, and much cupped. Not more than two hours before her death, the pulse remained still quick and hard.

*Dissection.*—Lungs everywhere free from adhesion; about four ounces of bloody serum on each side of the chest; a small quantity of pale fluid in the pericardium; very little water in the abdomen. The liver hard, with a thick curled edge, its membrane being rather white, and greatly thickened, and its surface irregular with tubercles. A considerable portion of its substance was divided into hard brown tubercular masses; the other viscera of the abdomen sound. "I speak," says he, "particularly of the kidneys."* It is clearly evident from this language, that his attention was in an especial manner directed to the kidneys, so that it is scarcely possible to conceive that, had their tissue been materially affected, the change would have eluded his observation.

Case XII.—James Lamb, aged 48, by occupation a carpenter, was squeezed between two logs of wood in a ship-building yard, and immediately brought to the Leith Dispensary, where he soon afterwards died. Upon dissection, the four superior ribs of both sides were found fractured. The right lobe of the liver was lacerated and torn. Its substance presented the appearance usually known under the name of cirrhosis. The kidneys were quite healthy. The bladder contained so little urine as to prevent our ascertaining its proper specific gravity; but which, nevertheless, yielded a copious precipitate both by heat and nitric acid. This man had enjoyed good health previously.

Case XIII.—V. Ward, aged 41, died labouring under the symptoms of *phthisis* and *diabetes insipidus*. Upon dissection, the lungs were found tuberculous. The liver had seemingly undergone fatty degeneration. The kidneys, and other organs, were healthy. The urine was of a pale colour; its specific gravity, however, was not ascertained; heat and nitric acid both yielded a copious albuminous precipitate.

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* Blackall on Dropsies, p. 145.

CASE XIV.—W. Saunders, aged 60, died of chronic ulceration of the epiglottis and larynx. Upon dissection, the liver was found partially affected with cirrhosis. The kidneys, as well as other organs, were, to all appearance, healthy. The bladder contained a small quantity of urine, which did not admit of its specific gravity being taken, but which yielded a copious precipitate by heat, which was not redissolved by the addition of acid.

The following are cases of various descriptions.

CASE XV.— William Hollingworth, aged 45, of very temperate habits, had long laboured under symptoms of diseased heart and blood-vessels, from which he at length sunk. Upon dissection, the left ventricle of the heart was greatly dilated, with proportional hypertrophy. The right auricle was greatly dilated, without hypertrophy. The inner membrane of the ascending aorta was covered with osseous laminæ.

The urine was of a dark-straw colour; specific gravity, 1022; heat and nitric acid both yielded an albuminous precipitate.

CASE XVI.—James Stirling, aged 23, a young man previously in the enjoyment of good health, was seized suddenly at Hull with indisposition, for which blood was taken from the arm. On his return home he was labouring under severe inflammation of the vein which had been opened. Latterly, symptoms of purulent effusion within the pleural cavity took place, under which he sank.

Upon dissection, the veins of the arm were found filled with purulent matter. Several pints of the same fluid were contained in the right pleural cavity. The kidneys and other viscera were healthy. About a pint of urine was passed in the twenty-four hours, of a straw colour; specific gravity, 1012; heat and nitric acid in this instance formed almost a solid coagulum.

CASE XVII.—Jane Paterson, aged 3½ years, had been affected with well-marked pertussis for about two months. By imprudent exposure to cold, an attack of *cynanche trachealis* supervened, and terminated fatally.

Upon dissection, the lungs were found to be the seat of interlobular emphysema. The larynx was highly vascular throughout, having its mucous surface covered here and there with soft lymph. Heart, liver, kidneys, and other organs were perfectly healthy in this case. The urine was pale and colourless; its specific gravity was not ascertained; heat and nitric acid, however, gave a large precipitate of albumen.

CASE XVIII.—J. M., aged 5 years, had a mild attack of scarlatina, from which he was convalescing favourably. About three weeks after the appearance of the eruption, his parents observed him slightly swelled in the lower extremities. At this period he was suddenly seized with dyspnœa, and severe lumbar pain, stretching itself down the thighs; the breathing was hurried and laborious, with loud mucous rattle over the whole chest; the urinary secretion was almost suppressed, and the small quantity passed was of a high colour, and deposited an abundant precipitate of a brick colour; pulse 170, strong and full. He was immediately bled, and leeches were applied to the loins. The urine was examined, and its specific gravity found to be 1015, at the same time that it contained an abundant proportion of albumen.

Upon dissection, both lungs were found in a state of active congestion; all the other viscera were healthy, with the exception of the kidneys, which were congested.*

As our limits will not permit a full detail of each individual case in which albuminous urine was detected, we must close this part of our subject by little more than a simple mention of those cases of disease in which this phenomenon was found.

1*st*. It was observed in the case of a young girl affected with pertussis. This girl is now in the enjoyment of excellent health.

*2dly*. It was observed in a case of *diabetes insipidus*, since dead, without a *post mortem* examination being obtained.

*3dly*. It was observed in a case of icterus, occurring in a previous healthy man, whose urine was of the low specific gravity of 1008. This man is since quite well.

*4thly*. It was observed in a case of chronic bronchitis, with diseased heart, where there was no reason to apprehend kidney disease.

*5thly*. It was observed in the case of a man for many years affected with syphilis, having lost his nose and soft palate by ulceration. This man had taken large quantities of mercury.

*6thly*. It was observed in a man labouring under severe gastric fever, owing to over-indulgence in eating and drinking.

*7thly*. It was observed in a young girl affected with severe rheumatic fever; and

*8thly*. It was observed in a case of modified variola, occurring in a girl four years of age, and the period when it was noticed was during the second day of the eruption.

We thus see that the simple appearance of albumen in the urine is not confined to those cases in which the structure of the kidneys has undergone an evident change; but that the same phenomenon is often visible in cases where the most careful examination fails to detect a deviation from the appearance which these organs ought to present in perfect health.

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* The appearance which the kidneys presented in this case was simply, as might have been *a priori* expected from the symptoms, that of active congestion, without the slightest vestige of any of the prominent appearances which, according to Dr Bright, characterize the first stage of the affection described by him.

In attempting to account for the renal secretion sometimes containing albumen apart from kidney disease, we shall take advantage, in our subsequent remarks, of some of the cases which we have previously detailed, in order to illustrate our explanations; for instance,

Case XVIII. presents us with an example of scarlatina, in which the presence of albuminous urine was discovered. In that peculiar form of anasarca which follows the scarlatinous eruption, more especially after imprudent and too early exposure to cold, it has been found that the urine possesses characters strikingly analogous to those of the granular kidney, in so far as one of the pathognomonic symptoms of the latter disease is concerned, viz. coagulability by the application of heat, or upon the addition of nitric acid. This well known phenomenon has often been alluded to, and brought forward by those who are disinclined to attach that degree of importance to the simple state of coagulability which the urine may possessas characteristic of renal lesion, and which the partizans of Dr Bright's doctrine value so highly. But, however little this example may be regarded as affecting the views of Dr Bright and his followers, it cannot be denied that the almost constant and general appearance of albumen in the urinary secretion of scarlatinous dropsy, goes not a little to stagger the faith of those, who would believe in its existence only in connection with organic lesion of the kidney; for, in order to reconcile this seeming incongruity, they have recourse to the expedient of almost identifying the two diseases. Harmony is thus established by their referring the scarlatinous and renal dropsy to one and the same cause, and the example of those opposed to this theory thus seemingly overturned; because brought forward for the purpose of showing that there were other diseases besides that of the granular kidney, in which not only did dropsy follow as a secondary or symptomatic affection, but that the urine might also be found to contain a large quantity of albumen, altogether independent of, and unconnected with renal lesion.

The attention of the medical profession was, we believe, first directed by Mr Hamilton to the fact, that in the scarlatinous dropsy, subsequent to the eruption, the kidneys when cut into present pretty much the same appearance as they do in the genuine form of Bright's disease in the first stage.

When we reflect upon the various forms which disease may assume; or when we compare the relative appearance presented by active and passive congestion, where none of the other more characteristic products of the former are present in addition to redness, we may well pause before we give absolute credence to such a sweeping proposition, as would declare that the kidneys, (admitting that they may externally present somewhat the same appearance in the two affections now under consideration,) are nevertheless perfectly identical in point of lesion. If such were the case, how comes it to pass that the mortality in the one disease so far exceeds that observed in the other? Ought not this very fact of itself to lead us to the suspicion that, in that peculiar form of disease of the kidney which Dr Bright has described, and with which his name is associated, there is a lesion of the organ widely differing from that which exists in the kidney after scarlatina? The vascular tissue which enters into the composition of this organ is liable to various gradations of tint, depending proportionally upon the quantity of blood which it may happen to contain at the time of examination. In most acute febrile or exanthematous affections, therefore, in which the natural and healthy function of the kidneys is either suspended or interfered with, it surely is not irrational to suppose, that active or passive congestion may, to a certain extent, be present in the renal substance; which peculiar condition of the vascular tissue we apprehend to be the real cause of the apparent similarity which exists between the real granular kidney and the same organ after scarlatina. The adherents of the doctrine which contends for the similarity of structural lesion, which the kidney is the seat of in the two diseases, for the purpose of throwing aside the simple state of passive congestion, and discarding this condition of the kidney as explanatory of the appearances which they assume it to present, may, with seeming plausibility in substantiation of their own proposition, bring forward cases of dropsy after scarlatina, in which the kidney presented unequivocal and irrefragable evidence of having undergone that pathological change described by Dr Bright and other authors. All this, we most willingly admit, may take place; but, on the other hand, we are disposed to regard these isolated cases as exceptions to a general rule, and as simple examples of the coincidence of scarlatina, and it may be subsequent dropsy, in a system where the kidneys were previously the seat of organic disease. More matter might easily be brought forward, even from Mr Hamilton's paper, for the purpose of showing that an essential difference exists between renal and scarlatinous dropsy; but this our present limited space will not permit.

We have alluded to congestion of the kidney, as likely to lead to the confounding of appearances presented by that organ in the granular kidney and scarlatinous dropsy; but we come now to consider hypothetically, as to the likelihood which exists of congestion also exciting an albuminous state of the urine. Although the general question has not yet been decided as to whether dropsy is to be ascribed to diminished absorption, or undue exhalation, it is, nevertheless, generally admitted in some cases to depend upon a want of balance between these two functions. Dr Marcet gives a particular account of the chemical nature of the dropsical effusions found in various diseases, and in different cavities of the body, as in hydrocephalus, ascites, hydrothorax, &c., from which it would appear that the prevailing animal substance is albumen, As plethora has been shown by Magendie to be unfavourable to absorption, may we not justly consider this state of the system as one of the predisposing causes of dropsy? Now, if the due equilibrium which ought to subsist between absorption and exhalation be thus interfered with by means of plethora, we may easily perceive how an organ, or structure within any of the cavities of the human body, becoming the seat either of active or passive congestion, should stand as cause to the effect of serous effusion, which subsequently succeeds in the cavity in which they may happen to be contained. If such is the case with regard to the pleural or abdominal cavities, by extending the operation of the same law to the kidney, we may perhaps explain the existence of albumen in the urinal secretion.

The pelvis of the kidney may justly be regarded in the light of a membranous cavity, so that any circumstance tending to excite fulness or plethora of its vessels, will have the direct effect of disturbing the balance between the functions of exhalation and absorption, the exhalation being increased, whilst *pari passu*, the absorption is diminished, may therefore satisfactorily enough account for a more than usual quantity of serum mingling with the proper renal secretion, and consequently giving rise to the existence of albumen. Such, we apprehend, takes place in those cases of diseased heart, more especially where hypertrophy of the left ventricle exists; in which albuminous urine is not unfrequently found, as in cases 10th and 15th; for it must be obvious to every one, that in such cases, the kidneys, as well as the other viscera below the diaphragm, are liable to become the seats of congestion, either owing to increased arterial action, or the imposition of some barrier to the free return of the blood by means of the veins. Were we to enter into the field of speculative inquiry, as to other probable causes of albuminous urine, we might readily mention a few.

We have said that it may be caused by a species of dropsy of the pelvis of the kidney itself, owing to plethora disturbing the proper balance between the function of exhalation and that of absorption; the blood at the time being in a state of perfect health. But may we not refer this phenomenon to an essentially morbid condition of the circulating fluid itself? The ancients were well aware of the important part which the fluids sustain in the animal economy; and were inclined to ascribe much, if not most diseased action, to some vital change in the nature and quality of the fluids themselves. Thence arose their system of humoral pathology. Perhaps none of the fluids were regarded by them so much in default as the blood; but, like all other too exclusive doctrines, the pathology of the humoralist gradually gave way to that of the solidist, who, arguing from the changes perceptible in structure, rested too much on simple organic lesion, to the almost total rejection of the changes which might previously have been effected, in respect of the quality and composition of the fluids by means of which these solids were maintained. That the blood as a fluid is subject to disease, is, we believe, pretty generally admitted in the present day; and if we reflect that the blood is next in importance to what we term *life itself*, since by its undisturbed and healthy circulation, that most mysterious principle is upheld, it is not difficult to perceive how vast must be the baneful influence exerted on the living economy, by a deviation of this vital fluid from the true standard and composition of health. Accordingly, we find, as the result of rigorous observation, that, in certain diseases, the blood undergoes important modifications.

Without entering into a minute chemical detail of this fluid, which would be foreign to our present undertaking, it may be sufficient to remark in a general way, a few of those diseases which most convincingly demonstrate to us the truth of these observations. *First*, then, we find that the absolute quantity of blood may be increased, as in plethora, or be diminished, as in that state of the system called anæmia; *2dly*, in respect of its quality, important deviations from health are sometimes distinctly cognizable. The various constituents of which it is composed may individually be either in a state of excess or deficiency; thus the solid material, or *crassamentum*, may be at one time too abundant; at another, the serum may preponderate or diminish in quantity or quality, whilst again the hematosine may vary as to its proportion. The fibrine, albumen, and salts entering into the composition of the serum, are also liable to important deviations. In the disease or peculiar condition of the system styled Chlorosis, we have a familiar illustration of the deficiency of colouring matter. The blood is also liable to deficient coagulation. Huxham says, in talking of the blood in malignant fever, "the crasis of the blood is not sufficiently firm, too attenuated; the serum blackish, and tinctured with red." The opinion of early writers, with regard to the imperfect coagulation of blood in certain fevers, has been subsequently fully substantiated and confirmed by the experience of more modern observers. In yellow fever, for example, Dr Stevens states, that the blood is in a much more fluid state after death, than is usually the case in other diseases. His words are, "the colour of the whole mass of blood, both in the arteries and veins, was changed from its natural scarlet or modena red, to a dark colour. I have frequently filled one glass with the black fluid taken from the heart, and another with the black vomit taken from the stomach. They were both so unlike the blood of health, and resembled each other so completely, that it was almost impossible to distinguish the one from the other; and from its appearance, it was very evident that such diseased blood could no more stimulate the heart, or support life in the solids, than putrid water can nourish vegetables, or carbonic acid gas support respiration."* In Asiatic cholera, again, we have an instance where the blood has been found in the very opposite state to this, as regards consistence, being thick, and of a very dark colour; but perhaps one of the very best instances for the purpose of exemplifying the wonderful change which the blood sometimes undergoes is to be found in the disease termed Scorbutus. Dr Mead, in describing the blood in this disease, says, "as it flowed out of the orifice of the wound, it might be seen to run in different shades of light and dark streaks. When the malady was increased it ran thin, and seemingly very black, and after standing some time in the porringer, it turned thick, of a dark muddy colour; the surface in many places of a greenish hue, without any regular separation of its parts. In the third degree of the disease it came out as black as ink, and, though kept stirring in the vessel many hours, its fibrous parts had only the appearance of wool or hair floating in a muddy substance."† In this affection, then, we see the wonderful influence which certain kinds of diet exert upon the quality of the blood. In the disease termed *purpura haemorrhagica*, or *hæmorrhœa petechialis*, we have one of the most palpable instances of abnormal fluidity of the blood, as is evident from the circumstance of its issuing from its proper vessels, independent of any abrasion. The mucous membrane seems to be the tissue from which it is most prone to flow. Looking at all those circumstances, therefore, it will surely be admitted that albuminous urine may result from a morbid or abnormal fluidity of the blood.

Other agencies still, we conceive, may be capable of producing an albuminous state of the urine. Dr Darwall says, "as a secreting organ, the kidney is especially liable to be affected by the pabulum afforded it; and should the blood reach it in an imperfect state, whether in consequence of indigestion, &c. we may expect that its function will be impaired." It is a well-known fact that the urine is often highly albuminous after having partaken of pastry and other indigestible substances. Our case 6th, not fully detailed, presents us with an example of albuminous urine following indigestion. May not nervous influence modify the renal secretion? Take for example the affection commonly termed hysteria as a familiar and daily instance of illustration. We all know that, in this affection, a pale and copious secretion of urine is one of its prominent symptoms, and it is to be borne in mind that this peculiar condition of the urine requires but little time for its developement. If, then, nervous agency has such a powerful influence in inducing the simple change of colour in the renal secretion, apart altogether from any thing like structural lesion, it surely is not difficult to suppose that a change or modification in its constituent elements, may be effected through the same medium.

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* Stevens on the Blood.

† Mead's Medical Works.

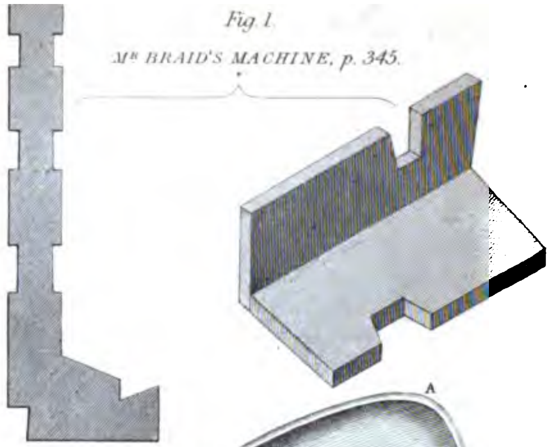
We come now to offer a few remarks upon the true value of albuminous urine, as pathognomonic of organic disease of the kidney. We have seen that the granular kidney is not the only disease in which albumen makes its appearance in the urine. We have also enumerated several instances in which this phenomenon was present, without the most careful examination after death, revealing to us any change of structure in the substance of the kidney. It must, however, have struck those who paid attention to the specific gravity of the urine, in those cases which we detailed, and where particular care was taken to ascertain this point, that in very few cases, indeed, had we anything like the unusual low specific gravity so characteristic of the granular kidney. To this physical symptom, then, we would be inclined to attach more importance as a single symptom, than the mere presence of albumen in the urine. Dr Prout says, "I am induced to conclude, that an albuminous condition of the urine taken alone, as a symptom, does not, in the present state of our knowledge, indicate the use of any particular remedy, or mode of treatment, but that, nevertheless, it is a symptom of which we ought to be always aware, since, taken in conjunction with the others, it may be occasionally useful in directing us to form a more correct judgment of the general nature of the disease."

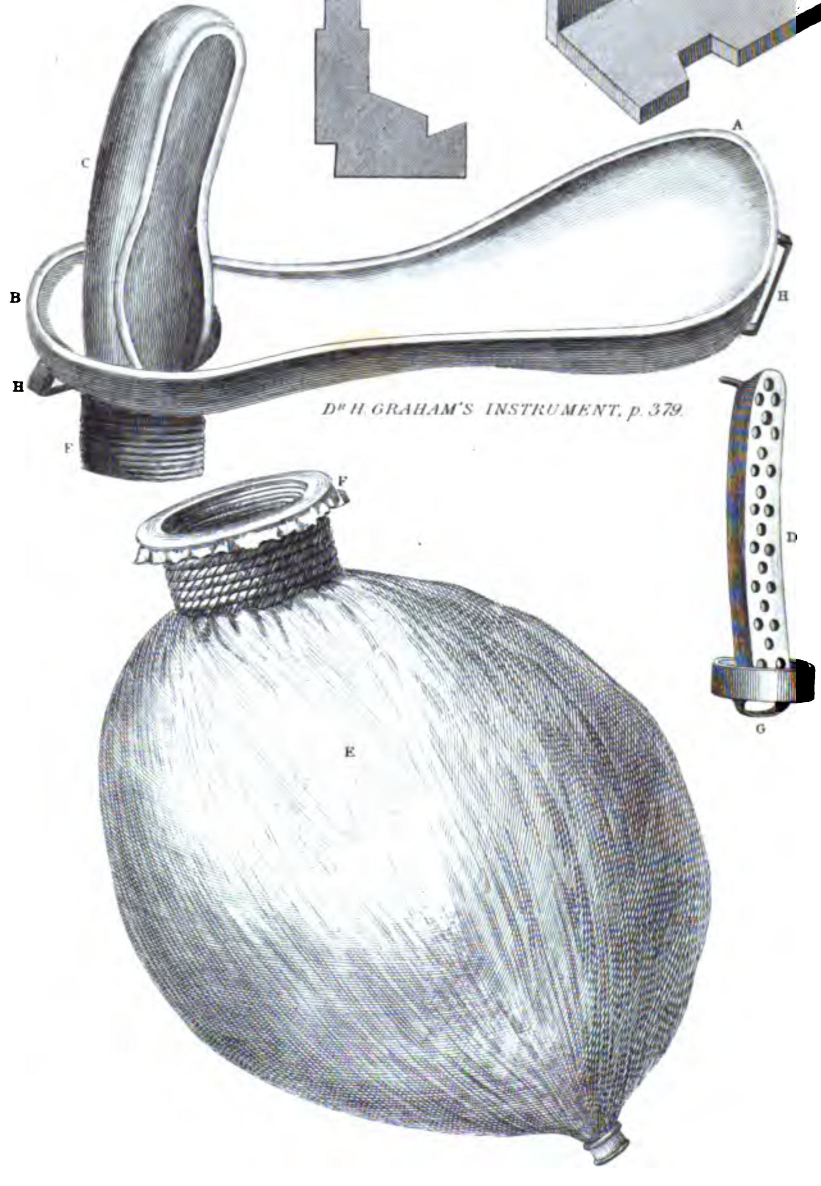
## ART. V.—*Notice of an Instrument for the relief of cases of Incontinence of Urine in the Female, and of Vesico-vaginal Fistula.* By HENRY GRAHAM, Surgeon, Edinburgh.

SOME time since, in a hopeless case of incontinence of urine in a female, I was applied to for some contrivance free from the objections attendant on the apparatus in common use for this disease, which are, 1*st*, The impossibility of retaining it always in its proper situation; 2*d*, Escape of the urine between the instru-

Fig. 1.

Mr Braid's Machine, p. 345.





Dr H. Graham's Instrument, p. 379.

G Aikman, Sc.

ment and the person, in the recumbent position; *3d*, The very offensive odour which the apparatus in a short time acquires, and the difficulty or rather impossibility of cleaning it sufficiently to remove this, and so requiring its frequent and entire renewal.

It appeared to me that these objections might be obviated by having an instrument formed of metal, so constructed, that a part of it, hollowed out on its anterior surface, might project into the vagina, so that this portion would not only tend to keep the whole instrument steady in its place, (when secured by tapes in front and behind), but also serve as a duct for the urine to pass down into a small bladder (containing a sponge), or caoutchouc bag, attached by a screw to the lower part of the apparatus, so that there should be no escape of urine when the patient assumed a recumbent posture. The bladder may be renewed as often as necessary at a small expense, or, if a caoutchouc bag be employed, it may easily be so thoroughly washed out, when the patient unscrews it for the purpose of its being emptied, that it will last for a considerable time. The application of this apparatus to cases of vesico-vaginal fistula is sufficiently obvious, and, by lengthening the vaginal portion, and making its extremity of a suitable form, it will serve, if necessary, as a pessary.

Any farther description of this instrument is unnecessary, as a glance at the diagram will at once explain its nature and mode of application.

The lady for whom I had this apparatus constructed has now used it for some time, and finds it to answer the purpose intended.

A. The anterior.—B. The posterior part of the apparatus.

C. Vaginal portion.

D. A moveable plate perforated with holes, to be used in cases of tumours arising (especially if by a narrow neck) from the anterior part of the vagina, to prevent them from falling into the hollow of the instrument. This in ordinary cases is not required.

E. Bladder, or caoutchouc bag for the reception of the urine.

F. F. Screws by which the bladder is attached to the rest of the instrument.

G. Loop or ring by which the perforated plate is withdrawn.

H. H. Attachments for the tapes by which the apparatus is secured.

To those practitioners who may have occasion for an instrument of the kind now mentioned, it may be well to say that Mr Hilliard, instrument-maker, No. 7, Nicolson Street, prepares them with great ingenuity and accuracy.

## Art. VI.—*Notes on Typhous Fever and its Treatment in the Aberdeen Infirmary during the years* 1838–39 *and* 40. By ALEXANDER KILGOUR, M. D.

A desire to economise, as far as possible, both my own time and that of my clerks, during the prevalence of typhous fever for the last three years, induced me to depart from the ordinary mode of reporting the cases, unless in those of more than ordinary interest, and to substitute for the usual case-book one admitting of short entries in a tabular form. From it, and from the prescription-books for my Fever Ward, I am enabled to make up the following table of the cases treated by me within the above period. One part of the table has reference to infection as the cause of fever, and to the state of the skin in regard to the exantheme; the other has reference to the mode of treatment. The attempt to bring the treatment within the tabular form is not common; and some may be inclined to doubt its applicability as a rule to guide us; but, in my opinion, general results may as much be relied on here as in any other case where the numerical system is adopted.

| 1838. | Admitted. | Infection. | Exantheme. | Dead. | No. Bled. | Leeches used. | Blisters used. | Ounces Wine. | Bottles Porter. |
|---|---|---|---|---|---|---|---|---|---|
| Mar. | 23 | | | 5 | | | | | |
| April, | 25 | 10 | 9 | 4 | 7 | 46 | 10 | 13 | 9 |
| May, | 25 | 9 | 15 | 3 | 5 | 6 | 22 | 18 | |
| June, | 30 | 11 | 14 | 5 | 3 | | 23 | 13 | |
| July, | 16 | 8 | 8 | 3 | 5 | 26 | 18 | 42 | 3 |
| Aug. | 14 | 1 | 5 | 2 | | 40 | 8 | 18 | |
| Sept. | 15 | 1 | | 3 | 5 | 44 | 13 | 22 | 1 |
| Oct. | 9 | | 1 | | 6 | 66 | 13 | 74 | 4 |
| Nov. | 12 | 3 | 3 | | 3 | 60 | 6 | | |
| Dec. | 20 | 2 | 4 | 1 | 3 | 24 | 8 | 12 | |
| | 189 | 45 | 59 | 26 | 37 | 310 | 121 | 212 | 17 |
| 1839. | | | | | | | | | |
| Jan. | 24 | 7 | 10 | 5 | 9 | 80 | 33 | 64 | |
| Feb. | 17 | 9 | 13 | 5 | 2 | 128 | 26 | 118 | 1 |
| Mar. | 14 | 2 | 2 | 1 | 5 | 86 | 14 | 46 | 3 |
| April, | 12 | 2 | 4 | 2 | 9 | 148 | 11 | 30 | |
| May, | 13 | 1 | 3 | 1 | 6 | 42 | 11 | 102 | |
| June, | 9 | 1 | 2 | | 8 | 64 | 17 | 46 | |
| July, | 19 | 2 | 3 | 2 | 4 | 74 | 19 | | 3 |
| Aug. | 23 | 2 | 2 | 2 | 1 | 44 | 19 | 128 | |
| Sept. | 23 | 1 | 5 | | 3 | 58 | 12 | 62 | 7 |
| Oct. | 35 | 4 | 2 | | 2 | 62 | 24 | 24 | |
| Nov. | 42 | 17 | 25 | 6 | 6 | 50 | 26 | 4 | 4 |
| Dec. | 55 | 36 | 25 | 5 | | 12 | 21 | 72 | 1 |
| | 286 | 84 | 96 | 29 | 55 | 848 | 233 | 396 | 19 |

| 1840. | Admitted. | Infection. | Exantheme. | Dead. | No. Bled. | Leeches used. | Blisters used. | Ounces Wine. | Bottles Porter. |
|---|---|---|---|---|---|---|---|---|---|
| 1840. | | | | | | | | | |
| Jan. | 45 | 24 | 35 | 4 | | 4 | 31 | 71 | |
| Feb. | 43 | 20 | 22 | 4 | | 18 | 23 | 17 | |
| Mar. | 56 | 34 | 42 | 9 | | 36 | 44 | 28 | |
| April, | 55 | 29 | 28 | 5 | | 8 | 37 | 78 | 3 |
| May, | 00 | 26 | 23 | 5 | | 10 | 33 | 32 | 9 |
| June, | 52 | 26 | 12 | 6 | | 10 | 33 | 128 | 9 |
| July, | 44 | 24 | 22 | 3 | | 14 | 35 | 54 | 19 |
| Aug. | 40 | 26 | 17 | 5 | 2 | 36 | 22 | 123 | |
| Sept. | 32 | 10 | 14 | 4 | | 12 | 25 | 74 | |
| Oct. | 41 | 24 | 26 | 2 | 1 | 8 | 19 | 58 | |
| Nov. | 41 | 26 | 19 | 3 | 1 | 12 | 31 | 116 | |
| Dec. | 35 | 16 | 18 | 3 | | 44 | 22 | 170 | |
| | 534 | 285 | 278 | 53 | 4 | 212 | 355 | 949 | 40 |

I. It will be seen from these tables, that the cases arising from infection, that is to say, brought from houses or families where fever existed, were in the first year, 23.80 per cent.; in the second, 29.22 per cent.; and in the third, 53.37 per cent.

I am certain, however, that these are considerably below the real numbers where the disease was produced from this cause; for I have long observed a disposition on the part of patients to conceal or deny their having been exposed to infection.

II. The cases admitted with the exanthema, or the eruption of typhus, in the first year, were 31.21 per cent.; in the second, 33.54 per cent.; and in the third, 52.05 per cent. So that the proportion is here nearly the same as under the former head. By another table, which was kept during the year 1840, the per centage of those admitted from infection, and having also the exanthema was 36.39, and of those having exanthema, but where they had not been, to their knowledge, exposed to infection, it was 15.66.

I am perfectly satisfied that this fever, call it by what name we will, is truly an exanthematous fever, though not observing the same periodicity or regularity in the cutaneous affection, as those longer known to us as exanthematous fevers. I attempted for some time to keep tables of the form, colour, date of appearance, and of disappearance of the exanthema; but the results were so exceedingly variable, and the characters of the exanthema, except in so far as regarded colour, had so little apparent connection with the type of the fever, and so little influenced the practice, that I gave them up. A table which was kept in 1840 of the cases from infection, but not attended with exanthema, gives us 17.60 per cent.; but in almost every one of the cases where the fever was caught from those having the exanthema, the cutaneous eruption was present. Thus of the students, fever nurses, and domestic servants in the hospital, who took the fever, every one had the eruptive form. In many cases it is confined to one part of the body, and the spots may be few in number and not very distinct unless to a practised eye. That the numbers are not higher in this column of the table arises from this,—that entries were only made of those cases where it was general over the body. I need not now-a-days say it is different from petechiæ, and that the two sometimes exist together in the same case. In those cases that were to be fatal, the exanthema often became like purpura, the spots being most numerous on the lower extremities; but in size and shades of colour always distinct from true petechiæ where the latter were present.

I have never known a second attack of exanthematous typhus in the same individual. It happened in several instances, that persons sent into the fever wards with inflammatory diseases, such as bronchitis, influenza, erysipelas, &c. were seized with exanthematous typhus, before they could be got out, or if sent out, were returned on us after a variable time with that disease.

III. The deaths in the first ten months were 1 in 7.26, or 12.68 per cent.; in the second year, they were 1 in 9.51 or 10.13 per cent.; and in the third, 1 in 10.07 or 9.92 per cent., or close upon 10 per cent. This mortality, however, it must be observed, includes all deaths in my fever wards, and it embraces, therefore, those admitted moribund, as well as some cases not fever. Taking the whole deaths against the whole admissions for the three years, the proportion is 1 in 9.34, or, deducting from both admissions and deaths, those admitted moribund, of which the number was 10, and in which death took place within twenty-four hours from admission, and deducting in the same way 6 cases where death was not connected with fever, it is 1 in 10.80.

IV. If we look again to the mode of treatment adopted, we find that one patient in 5 was bled or cupped in the first year; 1 in 5 the second; and 1 in 133 the third year. The average quantity of blood abstracted was ten ounces.

V. Taking the number of leeches applied, and allowing the loss of blood from each to be half an ounce (for draining from leech-bites was soon found to be followed by serious consequences, and, therefore, carefully guarded against), allowing also the average loss of blood in each case where leeches were used, to be ten ounces, it will follow, on adding together the bleedings generally and locally, that every 3.65 patient was bled to ten ounces in the first year; every 2.46 in the second; and every 38.14 in the third.

It must be here remarked, however, that some cases became inmates of the fever ward (and when once there were not removed) with acute inflammatory diseases, such as pneumonia, hydrocephalus, rheumatism, and variola; and as the above are the whole bleedings performed, and leeches used in these wards, a considerable deduction ought to be made from the estimated loss of blood in fever on account of these cases. No line of treatment was found more generally injurious than loss of blood from the arm, and even in cases of local congestion it was found that the loss of blood locally was not well borne. The bleeding from leech-bites in some cases was with difficulty stopped, and even sometimes broke out again. I am certain of having lost one patient from this cause.

VI. A blister was applied to every 1.56 case in the first year; to every 1.22 case in the second; and to every 1.50 case in the third year. They were extensively used to the nape of the neck or forehead in delirium, but were found most successful in the affections of the lungs, and stomach and bowels, attending fever.

VII. Each patient had on the average 1.12 oz. of wine in the first year; 2.08 in the second; and 1.77 in the third, The total quantity for the whole period was 1757 ounces, or about 1¾ ounces to each patient.

It will be seen that, during the year when the mortality was greatest, the quantity of wine used was the least, and that in the year when the bleedings were most numerous, the quantity of wine required was the highest. It must be here remarked, however, that much of the wine was given in cases of tedious convalescence; thus one case is recorded where the quantity used in this way was above nine bottles. The quantity of porter used was unimportant. A weak or medium beer, rendered very bitter by a large quantity of hops, was used to the extent of a bottle a-day in many cases, and being brisk and fresh, was found more grateful than porter. Ginger-beer was allowed to the same extent daily where the patient asked for it. Not two bottles of ardent spirits were used in the year; and the whole quantity of wine administered in the two years and ten months was (allowing twenty-four ounces to the quart bottle) six dozen, one bottle, and five ounces. I need hardly say that there was no limitation on the part of the directors of the infirmary as to wine, spirits, or porter, and the quantities prescribed were solely from the conviction that moderate quantities only were required in this epidemic. The state of the pulse and the colour of the exanthema afforded the chief indications in regard to the use of wine. The condition of the tongue I soon ceased to consider as any guide, and delirium was oftener an inducement than a bar to the exhibition of this cordial stimulant. I know nothing peculiar to this locality or the character of its population which should render the type of epidemic fever milder in it than in any other densely crowded manufacturing town; and the table, I trust, will prove that the mortality is as small as where this expensive remedy wine is given to a very great extent. I call in question no man's practice; but economy in charitable funds as that on which he was confined to bed, to that on which he was dismissed cured from the hospital, was, in 100 cases of each sex, taken consecutively, for

| | | |
|---|---|---|
| Males, | - | 26.89 days. |
| Females, | - | 32.83 |
| Both, | - | 29.86 |

Or, grouping them into periods, the dismissals took place in the following order from the day of the attack :

| | | Males. | Females. |
|---|---|---|---|
| Betwixt the 12th and 20th day, | . | 16 | 11 |
| 20th and 30th day, | . | 50 | 29 |
| 30th and 40th day, | . | 29 | 40 |
| 40th and 50th day, | . | 5 | 16 |
| 50th and 60th day, | . | | 4 |
| | | 100 | 100 |

It would appear from this table, that exanthematous fever lasted longer in females than in males, or that the period of recovery was more prolonged in the former. I am inclined to believe that such is the fact, but am at the same time well aware that males are impatient to quit the hospital, whilst females, on the other hand, are equally disposed to remain. This in part may account for the discrepancy in the averages ; I say in part, for the demand for admissions was, at the time the above selection was made, (1840,) too pressing to allow us to keep patients a day longer than they could walk out.

XI. The annual report of the Aberdeen Infirmary for 1840 contains the following table of the fever cases admitted for the year into my colleague, Dr Dyce's wards, as well as my own.

Table of fevers admitted during the year 1840, with the ages, sex, the moribund, or those who died within twenty-four hours from admission, the deaths, and the rate of mortality.

MALES.

| Age. | | Admitted. | Moribund. | Total treated. | Dead. | Propotion. | Per Cent. |
|---|---|---|---|---|---|---|---|
| Under 5 | . | 9 | - | 9 | 1 | 1 in 9 | |
| 5 to 10 | . | 50 | - | 50 | 1 | 1 in 50 | |
| 10 to 20 | . | 159 | 1 | 158 | 7 | 1 in 22.58 | |
| 20 to 30 | . | 110 | 1 | 109 | 15 | 1 in 7.26 | |
| 30 to 40 | . | 67 | 2 | 65 | 12 | 1 in 5.41 | |
| 40 to 50 | . | 59 | 4 | 55 | 17 | 1 in 3.23 | |
| 50 to 60 | . | 14 | 2 | 12 | 6 | 1 in 2 | |
| 60 to 70 | . | 8 | 1 | 7 | - | ... | |
| 70 to 80 | . | 3 | 1 | 2 | 2 | ... | |
| 80and upwards | | - | - | - | - | ... | |
| Total | . | 479 | 12 | 467 | 61 | 1 in 7.65 | 13.06 |

FEMALES.

| Age. | | Admitted. | Moribund. | Total treated. | Dead. | Proportion. | Per Cent. |
|---|---|---|---|---|---|---|---|
| Under 5 | . | 9 | - | 9 | 1 | 1 in 9 | |
| 5 to 10 | . | 41 | - | 41 | 2 | 1 in 20.5 | |
| 10 to 20 | . | 233 | 1 | 233 | 5 | 1 in 46.5 | |
| 20 to 30 | . | 174 | 1 | 173 | 12 | 1 in 14.41 | |
| 30 to 40 | . | 90 | 4 | 86 | 7 | 1 in 12.28 | |
| 40 to 50 | . | 69 | 2 | 67 | 4 | 1 in 16.75 | |
| 50 to 60 | . | 20 | - | 20 | 4 | 1 in 5 | |
| 60 to 70 | . | 17 | - | 17 | 4 | 1 in 4.25 | |
| 70 to 80 | . | 3 | 1 | 2 | - | ... | |
| 80 and upwards | | 1 | - | 1 | - | ... | |
| Total | . | 657 | 9 | 649 | 39 | 1 in 16.64 | 6.05 |

This table exhibits to us a corroboration of several facts recorded in the valuable tables of Dr Cowan of Glasgow and other medical statists. The females admitted exceed the males in the proportion of 1.37 to 1; or the females constitute 58.87 per cent. of the whole admissions, the males only 42.92. In both sexes, the period of life most liable to fever is from 10 to 30 years of age. The cases at this age are more than all the others united, or constitute 59.50 per cent of the total admissions.

The deaths in the males treated are more than double those in the females, being 13.06 per cent. in the one, and 6.05 in the other. The deaths betwixt the ages of 10 and 30 of both sexes are 5.82 per cent. whilst, of those above this period, they are 17.36 per cent. the mortality increasing, in the males especially, with the age.

It appears that in most hospitals more males are brought in moribund than females. This is in part dependent upon the fever being more severe in the former, and still more to the circumstance that the wife and family are anxious to keep the head of the family at home, (for most of the male moribund cases were married men,) and nurse him themselves, which they do until he gets unmanageable, or they themselves fall sick.

XII. I do not intend offering any observations on the causes of this epidemic fever. I shall shew merely, from the meteorological observations for 1839 and 1840, for Aberdeen, as kept by Mr Dickie, surgeon, that two conditions of the atmosphere—temperature and moisture, have nothing to do with it as causes.

| | 1839. | | | | 1840. | | | |
|---|---|---|---|---|---|---|---|---|
| | Patients admit. | Mean temp. | Daily range. | Rain in inches. | Patients admit. | Mean temp. | Daily range. | Rain in inches. |
| Jan. | 24 | 33°.29 | 6°.34 | 2·03 | 45 | 36°.71 | 5°.6 | 2.42 |
| Feb. | 17 | 36 . | 7 .92 | 0.35 | 43 | 37 .39 | 6 .4 | 1.74 |
| Mar. | 14 | 36 .33 | 7 .46 | 3.03 | 56 | 40 .39 | 9 .2 | 0.61 |
| April | 12 | 42 .63 | 11 .24 | 0.75 | 55 | 47 .41 | 13 .1 | 0.39 |
| May | 13 | 46 .18 | 12 .02 | 2.19 | 50 | 47 .10 | 9 .2 | 2.98 |

| | 1839. | | | | 1840. | | | |
|---|---|---|---|---|---|---|---|---|
| | Patients admit. | Mean temp. | Daily range. | Rain in inches. | Patients admit. | Mean temp. | Daily range. | Rain in inches. |
| June | 9 | 52°.70 | 11.37 | 3.13 | 52 | 53°.93 | 11.2 | 2.16 |
| July | 19 | 56 .62 | 11.02 | 3.00 | 44 | 55 .18 | 10.7 | 1.83 |
| Aug. | 23 | 55 . | 11.20 | 1.62 | 40 | 57 .55 | 11.01 | 2.1 |
| Sept. | 23 | 52 .29 | 10.14 | 4.43 | 32 | 51 .33 | 9.7 | 3.5 |
| Oct. | 35 | 46 .69 | 8.50 | 3.61 | 41 | 44 .93 | 9.2 | 2.58 |
| Nov. | 42 | 42 .20 | 6.75 | 3.26 | 41 | 49 .85 | 8.6 | 3.26 |
| Dec. | 55 | 38 .20 | 4.85 | 5.47 | 35 | 36 .40 | 6.0 | 1.76 |
| Total | 286 | *44.84 | *9.07 | †32.87 | 534 | *45.72 | *9.1 | †25.34 |

Thus it appears, that, if we take the mean temperature of each year, fever was most prevalent in that year when the mean temperature was highest. But the difference in the means of the two years, viz. 44°.84 for 1839, and 45°.72 for 1840, is so trifling, whilst the difference of the numbers admitted—286 for 1839 and 568 534 for 1840—is so great, that we cannot consider the two circumstances, temperature and number of admissions, as standing in the relation of cause and effect.

If we look also to the mean of the daily range for each year, we find the difference in the two years to be almost nothing.

If we be at the trouble to compare the summations for each month, the truth of the position maintained will be still more apparent. Thus, it will be seen, that in the month of January 1839, with the average temperature 33°.29, and the daily range 6°.34, the admissions were only 24; whilst in January 1840, with the average 36°.71 and the daily range 5°.6, they were 45. And lest it might be said that, according to this, a high temperature favours the extension of fever, we take July 1839, in which the mean temperature was 56°.62, and the daily range 11°.02, during which, the admissions were 19, and we put in contrast to this the month of December of the same year, when, with a mean temperature of 38°.20, and daily range 4°.85, we have 55 admissions.

Again, in regard to moisture, it will be seen from the tables, that there was a difference in the total fall of rain for the two years of 7.53 inches, and that fever prevailed most in the driest year, or 1840; but if, again, we take the monthly periods, we see the number of admissions the same when the fall of rain is great as when it is small. Thus in March and April 1840, the amount of rain for both is only one inch, whilst the admissions are 111; and in May, when the fall is nearly three inches, they are for that month 50.

The preceding notes were subjected to the perusal of my friend and colleague in the charge of the fevers in this hospital, Dr Dyce, in order that, if his observations and experience had led him to different conclusions in any of the points mooted, these might be

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* Mean for the year.

† Sum for the year.

stated, and a fair account or history, as far as these notes extend, might be obtained of the epidemic which has existed for three years past in this locality. He says, " I have to thank you for the opportunity you have given me of now perusing your notes on typhus, as well for the offer of adding any thing I may have to say on the subject. I fear, however, I can add little of importance, beyond a confirmation of the views you have advanced, from not having followed the plan adopted by you in my wards. I can furnish you, therefore, with nothing tabular or in detail.

" Generally your views singularly harmonize with mine, not only as to its chief source, contagion, the prevalence of an eruption, its differing from petechiæ,—in both eruptions often co-existing in the same individual at the same time, and in the subsequent desquamation; but especially in the treatment, and the conclusions you draw with respect to remedies held in repute; but which in this epidemic were, if not injurious, certainly far from being found beneficial.

" There is one point in which I differ with you, relative to the non-appearance of the eruption in the same individual in subsequent attacks, as I am certain I have met with more than one case where a second time a well-marked exantheme has been evident. You will recollect my calling your attention to one case not many months since, in David's Ward,—fortunately the relapses have been few, and the opportunities hence limited for observation on this point, still that it does occur I have not a doubt.

" It may perhaps be irrelevant to the object of your paper to notice a circumstance which was often very striking and marked, and which must have happened in your practice likewise,—I mean the frequent and sudden complete change in the type of the fever, as far as regards the symptoms—traceable, as far as my observation went, to no particular locality or state of the atmosphere. For months together the pulmonic symptoms prevailed almost entirely, then came those marked by gastric and intestinal irritation, and less often, though still continuing for a length of time in succession, those with high cerebral action. The first set, as is too well known, were by far the most intractable and fatal; the last, though sufficiently alarming, and always requiring restraint, more amenable to treatment than either of the others, if anticipated in their approach, or seen soon after their onset. By the way, the medicine I solely relied on in this latter class, you do not include among your list,—I mean tartar emetic. Given as described by Dr Graves, I have found it eminently successful, and have the greatest confidence in it.

" I quite agree with your remarks on bleeding. I found it rarely could be borne, certainly never to any extent; and when deemed necessary from the urgency of the local symptoms, a tedious convalescence invariably followed. I have hence for a long time trusted entirely to leeches and blisters, and have, in almost every case, been in the practice of limiting the time the leeches were to be permitted to bleed, from so often witnessing the ill effects of such a drain on an already weakened frame. Saline mixtures, infusions, and quinine, have never of late been used. The effects noticed were similar to those you describe. I make one exception to quinine in erysipelas following or appearing in the course of fever. Here, it seldom failed to arrest the disease, moisten the tongue, and improve the condition of the patient generally; but in no other state did I find it admissible."

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## Art. VII.—*Practical Observations on the Diseases of Peru, described as they occur on the Coast and in the Sierra.* By Archibald Smith, M. D. (Continued from Vol. lvi. p. 182.)

### II.—Diseases of the Coast Continued.

### Diseases of the Nervous System.

Regarding the class of nervous diseases, I have only a few cursory observations to offer; and begin by considering the nature of convulsions during infancy and early childhood.

*Mal de siete dias, or Disease of seven days.*—In Lima, the *mal de siete dias* means, in its most general acceptation, those spasms, convulsions, and convulsive colics that affect infants from the period of birth to about forty days after it, but more especially during the first week.

For the frequency and fatality of these affections, in former times, as described by the native writers on the subject, three principal reasons may be now assigned.

1. The barbarous practice of burning or cauterizing the navel string, which, we are told, is not yet quite disused by ignorant midwives; and this injurious practice might possibly, in former times, have given rise to some cases of *trismus*, or locked jaw.

2. The abuse of white lead, or *alvialdi*, formerly much used as an application to the excoriations of infants; and, in this way, many are believed (as I state on the authority of an eminent native practitioner) to have been poisoned during the first week or seven days.

3. The bowels of the infants were neglected and mismanaged; and unsuitable medicine, as coarse molasses, for example, was given to carry off the meconium. This remedy, by begetting acidity in the first passages, increased rather than relieved the irritation of these parts.

Mothers, in the first class of society, have now got into the practice of giving magnesia or castor oil as a laxative for infants, and the ancient management of the navel string and excoriations, is very generally abandoned. The consequence of all is, that the *mal de siete dias* is comparatively little spoken of, though a great many children die at a tender age from innate weakness of constitution, and many external causes; but, particularly, I think, from being at birth provided with a nurse of old and stale milk—often more than a year old—who either is left as the only nurse, or discharges the duty jointly with the mother. For early marriages and impaired health very often oblige the white mother to employ milk-nurses of African or Indian race. The milk-nurse in Lima is subject to several drawbacks besides that of stale milk, and the child is often passed from nurse to nurse in consequence of sundry defects. There is no small chance that the hired milk-nurse is pregnant, and in that case her milk is unwholesome; for very few, even of the hale zamba women (who are the most robust of any) can rear at the breast a healthy child, and bear at the same time another in the womb; hence, the popular dread against the *leche prenada*, or the milk of a pregnant wet nurse. These hired nurses of dark race are usually violent in temper, prone to anger, and their passionate propensities lead to biliary derangements in themselves, and, in such circumstances, if allowed to give suck, to sickness, diarrhœa, and emaciation in the unfortunate children whom they undertake to rear.[*]

I attended one case in a child two or three months old, which, if it had occurred in the earlier weeks after birth, would have afforded no bad specimen of that species of convulsion which, in former times, more particularly characterized the disease of seven days.

The body was thrown considerably back, as in opisthotonos; the head was bent back by spasmodic contractions of the muscles; and the neck and trunk became now and then very rigid, when the spasms came on with greater violence, which made the child cry out, as if in great pain. This attack was preceded by the disappearance of the vaccine eruption twelve days after vaccination.

Warm baths, and clysters containing castor oil, were, together with various anodyne liniments, used as remedies, when, after several days illness, an erysipelatous blush appeared around the faded crusts on the arms, accompanied with a great deal of tumefaction in the parts which it affected. In three days, this erratic affection, after having run over the whole body except the head, literally travelled out at the toe-points, leaving the child to recover very well,—which he did from the day on which the erysipelatous efflorescence had entirely left him.

The convulsions that I have frequently witnessed during the early months of childhood, and before any signs of dentition appeared, were usually consequent on disordered *primæ viæ*, and, in general, very manageable disorders, except where the nurse had some blemish that affected the quality of her milk. I found that they commonly yielded to such simple treatment as the warm bath and a suitable dose of castor oil, which is one of the mildest and most efficacious remedies for carrying away all offending matter from the intestinal canal.

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[*] “Non solum mox a partu convulsionibus obnoxii sunt, infantuli nostrates; sed etiam aliis temporibus, et præcipue, per lactationem;”...“potissimumque a nutricis prægnatione, quæ sanè nostratium puerulorum interemptor verber dici potest; ita ut plures, etiam, etsi uberibus ablatos, hâc nutricum nefandâ incuriâ miserrimè extinctos infantes vidi.” Vide Specimen Academicum de Morbis Nonnullis Limæ, &c. By J. E. de Davalos, published 1787.

When the convulsions of children proceed from painful dentition, scarifying the tumefied and inflamed gums is the proper remedy, which at once removes the local cause of irritation. And this simplest of operations, so rarely thought of or put in practice by native practitioners, I have often had recourse to with signal advantage, and gained by it not only the gratitude of parents, but the happiness of seeing the writhing and distressing contortions and spasmodic struggles of the child, speedily converted into pleasing smiles, and playful motions, expressive of bodily ease and contentment.

*Pasmo and Aire.*—These are common disorders, arising generally from the effects of cold air or water on the body when warm or overheated. The former, as I comprehend it, is more particularly applied by the vulgar to wry-mouth; and the latter is applicable to any degree of recent paralysis which happens to be referred to the baneful effects of cold, or cool and humid air as its exciting cause; and upon this account the hot regimen is sedulously applied by the women with a view to draw out, or counteract the effects of the "aire" or air, which they believe to have entered the paralytic part.

The effect of sudden exposure to great transitions from heat to cold, so as to check too abruptly the cutaneous and pulmonary perspiration, is not only *aire* or *pasmo*; but what is worse, in those cases where the action of the heart and arteries has been previously raised to excess—as occurs with *orneros* or furnace men at Ica, for example,—the action of cool air (like a draught of cold water received into the stomach when the body is overheated by exercise) is occasionally the immediate antecedent of sudden death.

The brandy made at the vine estates of Ica is exported in large earthen jars, which contain each four or five arrobas, or half-a-mule's load of spirits; and those jars or *botijas*, as they are called, to be made spirit tight, require to be covered inside with a sort of mineral tar or *brea*; and therefore it is usual to take out the *botijas* from the furnace in which they are baked, when almost red hot, so that on pouring the proper quantity of tar into them it will diffuse itself, or be made to spread equally over the inner surface of the jar, and this too, so exactly as to fill up and stop every pore through which the spirit could otherwise exude or evaporate.

The slaves employed in this service are accustomed to enter the furnace wrapped up in woollen clothing, which is said to be singed, or partially burned by the heat of the jars, which they have to carry out in their arms. Many thus employed are known to fall dead on receiving the impression of cool air at the moment of coming out from the furnace; and others who fare better are not rarely attacked by pectoral ailments, and especially what they call *fatiga*, which, as I have already explained, is a painful sensation, often symptomatic of visceral obstructions, and deranged digestion—or of irregular action, and perhaps a permanently diseased condition of the heart and larger arterial trunks.

A woman in a respectable sphere of life once assured me that she had suffered an attack of wry-neck from *aire* received in a very curious way. She had occasion to void urine in the open air, and by doing so with her face to the wind, or, as she expressed it, "*por mear contra el viento,*" she was seized with a temporary palsy of the tongue and wry-neck.

A little negress, about nine or ten years of age, soon after dinner washed herself all over with cold water; a kind of ablution to which she had never been accustomed, and then dressed herself for the theatre. In course of a few hours she returned from the theatre with a violent headach, the neck turned awry, and the mouth affected with *pasmo*—that is, distorted or drawn to one side. Her whole body was so unhinged, or under the influence of *aire*, that she could not stand on her feet; her pulse was small and sunk, and tremor pervaded her entire frame.

She was instantly conveyed to bed, and purgative clysters were administered, by the aid of which she had a moderate alvine discharge; reaction followed; intense fever ended in profuse perspiration; and next morning the girl was quite well, and very much inclined for breakfast. This case may convey an idea of the combination of the disorders usually denominated by the terms, *pasmo* and *aire*.

*Paralysis.*—Palsy in a chronic form is not rarely connected with various other diseases—as internal aneurisms and visceral obstructions, &c.; and the *aire*, when not early removed, or when it has lapsed into a chronic state, is included under the general denomination of palsy or paralysis, regarding which I have nothing very remarkable to say. I may just mention, however, that amaurosis or paralysis of the optic nerve is a frequent disease on the sandy coast of Peru, and it is often met complicated with cataract.

*Apoplexy.*—Those cases of apoplexy which occur in Lima often appear to be independent of general plethora, and to consist of a temporary cerebral congestion arising from sympathy with a state of irritation and repletion of the stomach and bowels. Hence, it frequently happens in practice that no more is required to remove the symptoms of compression of the brain, and to restore its energies, than to administer a smart purgative, and then apply a blister or sinapism to the epigastrium. Emetics are much too frequently resorted to in this affection, by native practitioners; for except in cases of more or less perfect apoplexy proceeding from recent indigestion, or excessive repletion, when the ingesta are yet in the stomach, and when vomiting would give immediate relief, emetics are hurtful, as they increase in the effort of vomiting the determination of blood to the head. Should bleeding be resorted to in such cases, cupping or leeching will commonly answer every useful purpose; for as this sort of apoplectic attack very often occurs in old or weakly persons, it is of importance to avoid any unnecessary general depletion.

The following example may serve to show how easily a disordered state of the bowels, under bad management, may lead to apoplexy or palsy.

A stout young woman went to a marriage party, and, in common with every one present, both ate and drank too freely. On the day following, she bathed her feet in warm water, and then walked about bare-footed. The consequence was a quick fever; the belly became elevated and tumid; vomiting and headach also presented themselves.

A native practitioner, who was called to her assistance, endeavoured to settle the stomach, and cure her by refrigerants, such as chicken-tea (*agua de pollo*), ice, pine juice and other vegetable acids; but under this treatment the young woman grew worse. He then ordered purging pills, but these did not open the bowels. She became drowsy and nearly insensible. He ordered her *sacramental confession*, but consciousness had left her. She became lethargic, and her mouth was twisted or distorted to one side, while her body, to use the words of her attendants, was *como un tronco*, or as inactive and motionless as a block of wood. In this state I saw her, and received the above account of her case. I prescribed cupping at the nape of the neck, and an active purge, which soon operated freely, dislodging a large portion of feculent matter from the bowels. After this, her head, which was shaved and kept covered with an evaporating lotion, was relieved; intelligence returned; the abdomen sunk to near its natural level; and day after day she went on, by attention to the state of her bowels and diet, &c., to recover from a perfect state of *hemiplegia*, in which she had continued for several weeks.

On this case I remark, that the indiscriminate application of iced-drinks, with a view to stop the vomiting, was injudicious practice, while the bowels were known to be excessively loaded by irritating ingesta, rendered still more injurious by the circumstance of bathing the feet and consequent exposure to cold. Had the practitioner attended to the obvious cause instead of the effect, he would have at once given a smart purgative or bolus of calomel with jalap, scammony, or some such active ingredient, which, aided by a clyster or two, would have speedily cleared the bowels, and there would in all probability have been no more headach or vomiting; and neither apoplectic lethargy nor hemiplegia would have ever occurred in the train of morbid changes.

*Catalepsy.*—I once met with what might be considered as a modification of this disease in a stout zambo boy, who served in the family of Don Jose Renovales of Lima. He retained his senses during the attack, in which he stood motionless as a statue, and sometimes on one leg, or in some other striking attitude, which induced us to suspect that he played a counterfeit part. But one day he was ordered to walk into the *sala* or ante-room to see me, and all of a sudden he drew himself up on one leg, and appeared to have become at once rigidly fixed. I suddenly struck him on the leg that sustained him, and he fell to the ground like a jointless piece of timber, without exerting a muscle to save himself. We then regretted our distrust of his veracity ; for he assured us that these attacks were perfectly involuntary. His bowels had been previously opened without sensible benefit; and his pulse being full, though not frequent, I had him bled at the arm, and then his disorder entirely left him.

*Epilepsy.*—This disease is an exceedingly common one in the capital of Peru ; and many cases of it probably originate from the irritation of worms in the stomach and bowels ; and in several instances, however induced, it may be protracted from constitutional weakness, in which case tonics and change of climate may be of some use.

I knew a lady cured of this disease, after having been a martyr to it for several years, by a short sea-voyage to Guayaquil ; but whether the disease ever again relapsed during her after residence in Lima, I have not heard.

In one case where this disease affected the mother of a family it was removed—(as I have also seen a case of chronic paraplegia in a robust man from Ica removed)—by a course of purgative medicine, which served to correct the bad state of the intestinal secretions.

Those who are habitually subject to epilepsy use ice as a common remedy—especially in the warm season ; and the cold bath is sometimes supposed to have a favourable effect. In general, however, it is a most intractable disease ; and one to which passionate, and perhaps, in other respects, intemperate females are very prone, while the most gentle and exemplary do not always escape its attacks.

*Tetanus.*—This is a disease of which only three instances fell under my observation, during many years residence in Peru. It is said, however, that the disease is not uncommon among the blacks engaged in agriculture on the coast.

I have seen in the Hospital of St Ana, a case of simple trismus, or locked jaw, without any rigidity of other parts ; and it was caused by an ulcer on the shin ; for as the ulcer healed up, the trismus disappeared after having continued several weeks. The subject of it was English or American.

In the two other instances which came under my observation—the one was in the person of a young Frenchman, the other in an elderly Limeno, both of whom I visited in a medical junta—the locked jaw was accompanied with a spasmodic rigidity of nearly the whole body ; and in the latter case, the spine was thrown backwards as in opisthotonos.

An English gentleman, resident in Lima, lost a favourite riding pony from locked jaw, which, if I remember well, was occasioned by the wound of a nail somewhere about the hoof.

*Hysteria.*—Hysteric affections, in different degrees of intensity, are among the nervous diseases to which we see young women subject in Lima ; and I remember one instance of it in a robust young lady, in which the convulsive motions were very sudden and violent; and baffled all treatment, medicinal and moral, till at length the cold bath was tried with decided advantage. Therefore, the tub of cold water was always kept ready, and she was instantly immersed in it as soon as any of her fits came on.

A middle-aged gentleman in Lima, inclined to corpulency, and of licentious and gambling habits, was subject to fits of an hysteric character, sometimes induced from no assignable cause, but often from acknowledged mental annoyance and vexations.

On such occasions he felt a fulness and tension about the *scrobiculus cordis*, which ascended to the heart, and there gave rise to a sense of oppression. He also experienced a particular uneasiness and sense of straightness about the throat, which was accompanied with a fit of weeping, and a mental state of confused thought full of melancholy foreboding.

These paroxysms of no rare occurrence, (during which I have been often called to give relief,) were removed by soothing conversation, and such simple means as a glass of warm negus, and hot baths to the feet, which were chilled during the fits; and on the morning after, he would take with much benefit, a mild purge, followed, when it had ceased to operate, by cooling beverages or "frescos" of pine-juice and iced-water.

This gentleman was sometimes a little hypochondriacal, though pure hypochondriasis, (or that gloomy spleen which is ascribed to the English character,) is not a very frequent disease in Lima, where the buoyant imagination of youth is often continued as the cheerer of old age.

*Hydrophobia.*—This disease appears to have been unknown on the shores of Peru, until in the excessively hot summers of 1803, 1804, (as we are informed by Dr Unanue, Observaciones sobre el Clinia de Lima, 2d edit. p. 67,) when it broke out in the scorched valleys along the northern part of the coast, whence it proceeded, with an epidemic course, southward to Ica and Arequipa.

It is stated in the work just referred to, that, of forty-two individuals bitten by rabid dogs, and who died in the town of Ica, the greater number died from twelve to ninety days after being bitten. When the symptoms consequent on the ingraftment of the poison by the bite disclosed themselves, there appeared convulsions, oppression at the breast, sighs, sadness, laborious breathing, horror at liquids and shining objects, fury, atrabiliary vomiting, and an incessant urgent call on the part of the patients, that the assistants should depart from them, because they felt themselves impelled to attack, bite, and tear them to pieces. None in this state survived more than five days.

It appears that the foresight of the Viceroy Abascal had saved Lima from the ravages of this furious epidemic, for he ordered a general slaughter of the dogs in the city—a practice continued to this day at appointed periods, when the *aguadores* or watermen are early in the morning closely engaged in this revolting duty.

During my long residence in Peru, I never witnessed a single case of declared hydrophobia, but was, on several occasions, called to see those who were thought to have been bitten by a mad dog; yet the probability is, that on those occasions, when no bad consequences were known to result, the bite was not very venomous.

In cases of this nature, where the wound inflicted is in many instances only very superficial, the native practitioners resort to escharotics, which they apply over the abraded or wounded part. I have myself, on one occasion where the dog's fangs had made a deep wound, applied cupping-glasses, and abstracted a good deal of blood, and with it, perhaps, what venomous matter, if any, might have been deposited by the bite. I have also given the infusion of guaco, which is of such wonderful efficacy as the well-known antidote to another kind of animal poison—that of the viper. In the vale of Lurin, seven leagues from Lima, an Indian labourer or " yanacon" once came to me in great alarm, exhibiting a wound in the fore-arm, which he said he had just received in the neighbouring thickets from a mad dog. I desired him to suck at the wound, (spitting out what he sucked,) with his own mouth, till he was tired, as no one else would undertake this task for him. He did it himself, and the benevolent Mr Thomas, to whose hospitable abode on the rock of Buena Vista, the yanacon came for sympathy and aid, immediately dispatched a messenger to Lima for a solution of chloride of lime, and applied linen dipped in this liquid to the wound, which healed well, and no ill followed.

A respectable young man in Lima informed me, that in the street of Carmen Alto, where his brother-in-law, Mr Lucio, had extensive office-houses, a mad dog, one day in hot summer weather, entered the yard and bit ten or twelve dogs of a fine breed of watchers.

Amongst these was a bitch with her pups. The bitch became affected three or four days after she had received the bite. After her, the pups, and then, successively, almost all the dogs in the yard became disordered within the space of a few weeks.

The symptoms were a kind of staggering gait and stupefied look, with redness of the eyes and profuse salivation. When in this state, Mr Lucio, the owner of the valuable breed, ordered them to be killed before the disease should proceed further, or have time to make the animals run quite mad and outrageous.

In what is called the *peste*, or *distemper*, which usually attacks young dogs in Peru, there are not only catarrhal symptoms with *bavas* or a flow of saliva from the mouth, vomiting and loathing of food; but the whole body, as the disease advances, becomes tremulous or convulsed, and the distempered dog totters or falls as he attempts to walk, and, when the hind-legs become paralytic, he drags himself along.

A talented friend, Don Manuel de Ortis Seballos, in Lima, informed me a few days before I embarked on my homeward voyage in March 1836, that, on finding a young pointer of his own rearing affected with those symptoms of distemper or *peste* which

I have enumerated, he gave the dog the infusion of guaco. Two or three doses having been poured down the animal's throat, when in the last stage of the distemper, and hardly able to drag himself from one side of the corridor to the other, and to all appearance dying, the result was, that he became so quickly reanimated and improved, that within twenty-four hours the convulsions left him, and he took food which he had not before done for many days.* This recovery was a surprise, and a subject of conversation to the family of Seballos, who were residing at the time in a country seat at Miraflores. While in this summer residence the same gentleman was one day requested to see one of the neighbours, who was attacked by a distressing case of cholera morbus, attended with every appearance of fatal collapse, and dreadful cramps. He thought of the tonic and antispasmodic powers of the remedy which had so happily cured his favourite dog; and resorted confidently to the infusion of guaco, as neither ice nor medical assistance could be had nearer than Lima, four or five miles distant, The consequence was a speedy solution of the cramps and a quick recovery; so that, according to Don Manual, the man who in the evening was found moribund-like in the frozen grasp of cholera, he saw next morning amusing himself and neighbours, by singing and playing the guitar.

*Insanity.*—Lima is above all other parts of the Peruvian republic remarkable for a large proportion of fatuous, demented, and maniacal individuals. It is, however, only those whose malady has rendered them ungovernable, or not easily managed at home, that are usually subjected to rigorous hospital confinement under the charge of proper keepers and physicians. In the hospital of San Andres there are never fewer than forty or fifty male patients of this class, and in the female hospital of La Caridad there may be about the same number.

Dr F. Faustus, the very intelligent and experienced physician of La Caridad, once told me that such as are deprived of reason from the violence of mental emotion or the impetuous torrent of passion, afford the best hope of recovery, and that their ailment often yields to time and medical treatment; but that those, on the other hand, whose insanity originates in deranged organization offer little prospect of recovery. He has had under his care, at different periods, as many as six individuals out of the same family: and here, he very properly observed, there was hereditary organic lesion. When this latter condition happens to be that of the patient, and that remedies have had due trial without any consequent improvement of mental health, the system pursued afterwards is merely to commit the insane to more or less strict confinement, according as the particular case of each person may need; and all of them are bathed once in the twenty-four hours in cold water. This also is the general plan pursued in the mad-house department of the hospital of San Andres.

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* It may not be irrelevant to remark, that. since the writer's arrival in England, he has had an opportunity to try the effects of the guaco on a much-prized tortoiseshell cat that was observed to have been suddenly attacked as if poisoned, when looking after prey. She appeared actually dying; saliva flowed from her mouth; looked stunned; could not hold up her head, and was paralysed in every limb so as to be unable to walk or even to move. He happened to think of the guaco, of which he had a piece at hand. An infusion of it was instantly prepared, of which a desert spoonful was given the cat every half-hour till she had taken three or four doses, after each of which she became more and more revived; and in a few hours after visited her kittens, which were only a week or two old.

*Delirium Tremens.*—In this peculiar kind of mental disorder there is fever, general tremor of the body, mental illusions, or even a wild incoherency of ideas, with an insane violence of action; and I have only seen it in persons addicted to ardent spirits and frequent inebriety.

The natives of the coast in general are a remarkably sober people, and, therefore, this is a disease they appear to be free from, but I have known it attack several of those indiscreet foreigners who were heavy carousers or habitual tipplers.

After hard drinking fits of fever with tremor may arise without insanity; and from this condition, rest, some cooling laxative, and an opiate may soon restore the unhappy individual. But, when raging mania accompanied the disordered state of the corporeal system, and the violence of the patient rendered the employment of a straight jacket necessary, either for his own or other people's safety, I have seen the nervous system, under such circumstances, wonderfully calmed by giving the sufferer iced-water to drink, and by several times daily pouring cold water on the shaved head, till it produced a decidedly sedative effect. When convenient, he may be made to stand as often as necessary under the spout of a fountain, such as is common in Lima. The latter method was adopted in the Hospital of Sant Ana with the best effect.

*General Remarks.*—In bringing my sketch of the diseases of Lima and the coast of Peru to a close, I must remark that rheumatism, both acute and chronic, is no rare affection, and, in some instances, when it occurs in the latter form, it is extremely obstinate, and follows in its character the course of the seasons, being very severe in the damp and misty season, while, during the warm summer months, it spontaneously disappears as the cutaneous perspiration is increased.

The chronic form of this disease is sometimes relieved by the warm bath and syrup of morphine, which, as an anodyne, commonly agrees with the Limenian better than the tincture of opium. From the *Colchicum autumnale*, I have seen very little advantage derived in such troublesome cases.

General bleeding is the best remedy in acute rheumatism; after which, purgative and sudorific remedies may be very valuable.

Of gout, I never knew more than one case during all the time of ten years and upwards which I passed in Peru; and that instance happened in the person of a much honoured old Spaniard, the late Don Pedro Abadia, whose commercial power, and court influence, under the regal dynasty, was annihilated by the Revolution, which reduced him to suffer great pecuniary privations, and much mental agitation. He was a remarkably sober person, and a great walker, yet a victim to painful attacks of gout in the great toe. For these attacks, his most usual remedy, besides aperient medicine, was fomentation of the part, with a decoction or infusion of wild-rosemary, (*Romero de la puna*), in which his experience of its efficacy made him place great reliance.

*Diabetes* is a disease of which I never met with more than one example, and that occurred in the form of *D. Mellitus*. The subject of this case was a delicate-looking and fair-complexioned youth of Spanish parentage.

The urine voided by him was excessive in quantity, and of saccharine quality. He had the usual symptoms which characterize the disease; and, having gradually wasted away, he died of this infirmity.

Urinary calculi, or gravel, is so rare a malady that I never knew or heard of more than one case of it during my residence in Peru; and that particular instance occurred in the person of a rich and elderly miner, from the mining district of Cerro Pasco. I saw this person in consultation with an eminent Surgeon, a native of France, Dr Dunglass of Lima: but I cannot give the details, nor do I know the result of the case.

Diseases of the urinary organs in men are frequently heard of under the name of dysuria; and to promote the flow of urine, the natives drink a great variety of medicated sorts of beer, or *chichas*. But the truth is, that the usual foundation of those disorders current under the appellation *males de urina*, are chronic inflammations of the urethra and mucous coat of the bladder; or strictures in the urethra, which, very frequently, indeed, lead to the formation of *fistulæ* in *perinæo*.

Gonorrhœa is a very common disease, generally ascribed to great heat and agitation in the blood, occasioned by frequent disappointments and annoyances; and not rarely the evil is attributed to long journeys and rides, though made with choice saddle beasts, such as the pacers and amblers of the country; and a journey performed on the comparatively rough and trotting Chileno horse, would, in the mind of the most scrupulous, satisfactorily account for the appearance of a very bad gonorrhoea.

Such causes as here assigned may, it is true, aggravate the disease when already existing; but it would be too much to concede that they can give rise to a venereal affection, though they may sometimes excite irritation in the urethra, accompanied with more or less discharge. Blennorrhœa, independent of any syphilitic cause, is not of rare occurrence among female children in Lima under six or eight years of age: these cases are commonly said to arise from walking more than usual in warm weather.

Piura is greatly celebrated as a Peruvian province, blessed with air and water so antivenereal as to eradicate the poison from its hidden crevices in the human frame, and to cure all those strangers affected with this malady who happen to sojourn in that part of the country. But I am informed on the authority of a medical gentleman resident in the province, that, notwithstanding this praise, syphilis is really one of the prevalent distempers of that locality. When this disease appears in its secondary form, which it sometimes does, without, I believe, having manifested any very decided or unequivocal primary symptoms, the affection is attributed to the bad state of the blood and humours of the individual, who is often willing to consider this misfortune as hereditary to him, and feels opposed to the use of active specific remedies.

Strong and easily traced prejudices still exist in Lima against mercury, which, in all its forms, has been, like the best things, often abused; and for this reason, in particular, the cure of venereal affections is frequently neglected in a lamentable manner. These are often seen to pass on to a very miserable and mutilating termination when only opposed by the ordinary palliative remedies, such as warm baths, sarsaparilla, and decoction of the woods, &c.

In elucidation of the alleged abuses of mercurialization as formerly conducted with fearful severity, I give the following account of the matter, as received by me from one of the oldest and best informed physicians now in Lima.

He says, in the practice of the famous clinical practitioners of my younger days, *ptyalism* was kept up for forty days, and all this time the patient was tortured within ten folds of bed-curtains to exclude the smallest breath of fresh air. Many sunk under this trying process, in which the cure was thought worse than the disease. From the day he commenced a mercurial course till he got well, the patient did not venture to change his linen for fear of getting cold, to which he was the more liable, as he was miserably reduced in flesh and strength in the course of forty days' salivation, which were nearly equivalent to so many of starvation. Being afraid lest they might take cold, and because they were not naturally of very cleanly habits, they neither shaved nor washed all this blessed time of medical purgatory.

Upon such a statement as here given it would be superfluous to offer a lengthened comment. It comes from competent authority; a native an eye-witness, and himself a medical practitioner, not bigotted in the ways of his masters, or aged contemporaries of the old school.

The above relation was made as illustrative of the improvements in the present milder mode of curing syphilitic diseases under the proper administration of mercury, as contrasted with the old way, which he strongly stigmatized as barbarous. And his account of the ancient practice of eminent practitioners in Lima, (still fresh in the recollections of many,) furnishes a good apology for whatever dislike the natives at present entertain to mercurial remedies, of which, it must be confessed, that they more frequently require the help than their prejudices on this subject will allow them to believe.

ERRATA IN LAST PAPER.

Page 167, line 23, *for* 1836 *read* 1826.
—— 171, — 22, *for* Zamba *read* Zambo.
—— 179, — 13 from foot, *for* precion *read* porcion.

## ART. VIII.—*Case of Hydrencephaloid Disease.* By CHARLES WILLIAM GRAHAM, M. D., Surgeon, Edinburgh Militia.

NEAR eleven o'clock on the night of the 26th March 1841, I was urgently requested to visit a little girl of Mr M———'s, two years and a-half old.

She had been under the charge of a medical gentleman here for the two previous days, so that I did not exactly learn what treatment she had received, except that some doses of calomel, and several domestic enemata had been administered.

On examination, I found that the child had no pain on pressure being applied to the region of the stomach and bowels, though there was the most urgent desire for cold water, which was immediately rejected. The skin was cool; the pulse 88, soft, and moderately full; the tongue thickly coated to the point, and red round the edges. The bowels were confined; there was constant picking at the nose and angles of the mouth; and the child awoke suddenly screaming from short sleeps; the countenance was occasionally flushed; the urine was high-coloured and scanty.

I recommended the application of a sinapism, for half an hour, over the region of the stomach, thereafter a small tablespoonful of castor oil, and to be repeated if the bowels were not relieved.

On the 27th, 8 A. M. The symptoms continued as at last night's visit, with the addition of strabismus, dilatation of the pupils, grinding of the teeth, and the pulse was small and very feeble; the face pale and features collapsed. The child had suffered two or three convulsive seizures. She had passed two dark-coloured, offensive evacuations after the second dose of oil; but the stomach still continued very irritable with great thirst.

I gave her a tea-spoonful of sherry in the form of negus, and ordered a blister to the region of the stomach, the extremities to be wrapt in warm flannel, and to have every hour and a half eight drops of the *Spt. Ammon. Comp.*, alternated with twenty drops of brandy in arrow-root. Absolute rest was enjoined, and orders were given that the child should on no account be raised into the erect posture. At noon, the convulsions had greatly increased in violence and frequency, and were of longer duration, with constant tossing of the arms and general restlessness. Two drachms of assafœtida were directed to be dissolved in eight ounces of boiling water, and after being strained, half of this solution was thrown into the bowels. This acted like a charm, for the fits ceased immediately, and never returned; vomiting also ceased. The ammonia and brandy in arrow-root were continued.

5 P. M. Symptoms continued as at last visit; pulse 124, small and feeble; surface warm; breathing occasionally stertorous and suspended.

9 P. M. No alteration. Three drops of laudanum were directed to be given every six hours along with the brandy and ammonia.

28th, 8 A. M. She had passed rather a good night; got her, with some difficulty, to show me her tongue, which was very red and somewhat fiery; the thirst was abated; but there was continual tossing of the arms; the eyes were half-closed and turned up; the pupils contractile; pulse 118, soft and rather full; the bowels not opened since yesterday; and the urine was passed in bed. The blister had risen well.

Directions were given to continue the ammonia and brandy, increasing the dose to ten drops of the former and thirty of the latter; and to discontinue the laudanum.

1 P. M. No change in the symptoms. Continue the same.

9 P. M. Symptoms greatly aggravated since last visit; has all the appearance of sinking fast; the extremities becoming cold, as well as the nose and cheeks; she is still able to swallow. The brandy, &c. to be given more frequently, and warmth applied to the limbs.

I returned at 11 P. M. and remained during the night.

At 2 A. M. of the 29th, my little patient lay in a comatose state, from which I could not rouse her; the powers of deglutition seem to be nearly gone, as the arrow-root and brandy run from the mouth.

I sent for the following mixture. *Aquæ. Carb. Ammon.* ℥i. *Olei Crotonis Tig.* gtts.1; *M.* With this liniment the nape of the neck and back part of the head were well rubbed for ten minutes. Shortly after, she began to complain of pain, and frequently applied her hand to the part that was rubbed with the embrocation. I got her now to swallow a little arrow-root and brandy; afterwards, she fell into the same dozing state for four hours, when she was again rubbed and had some nourishment given her.

At 7 A. M. She seemed more sensible than I had seen her for the last two days; squinting continued, however, along with dilatation of the pupils. The pulse was 106, more full, and improving in strength. Two drachms of castor oil were ordered to be given in beef-tea, and the ammonia, &c. at intervals of four hours.

At 10 A. M. Bowels have acted well, the evacuations copious, dark, and offensive.

2 P. M. Strabismus gradually going off, and the eyes and countenance assuming their natural appearance.

9 P. M. Pulse 96, becoming stronger; has had another alvine evacuation, neither so dark or offensive. She takes the beef-tea readily. Brandy and ammonia to be discontinued.

30th. She has passed a good night; squinting completely gone; features more expanded, and countenance cheerful and lively; tongue very fiery; appetite rather keen, and continually calling for bread. Two drachms of castor oil were given; and the beef-tea was continued. From this date, my little patient, by strict attention to the bowels, and mild nutritious food, progressively improved, and was soon restored to her wonted health.

I could adduce many similar cases of this very singular morbid affection; but suffice it to say, that they were all subjected to the same treatment as the one now recorded, and attended with equal, though unlooked for success.

To the writings of Drs Abercrombie, Marshall Hall, and Gooch, and the work of Drs Evanson and Maunsell, I certainly feel much indebted for the knowledge I have obtained of this disease. The similitude of this affection to *hydrencephalus verus* is so great and so strongly marked, that it may be very readily mistaken for, and treated as such by the general practitioner; and this is one of the chief reasons that induces me at present to direct attention to a subject which, there is reason to believe, is not very generally understood.

It is a fact which cannot be denied, and should ever be borne in mind, that there are diseases which, while they have a great resemblance to each other, arise from the most opposite causes; and it is not to be wondered at, therefore, that the brain should become affected in a manner so remarkably similar, from the two opposite states of over-fulness and of deficiency of blood.

*Dalkeith, 18th June* 1841.

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## ART. IX.—*Case of perfect Ankylosis of the five Superior Cervical Vertebræ to each other, and complete Dislocation backwards of the 5th from the 6th, without fracture.* By STEPHEN S. STANLEY, Member of the Royal College of Surgeons in London, and Assistant Surgeon of the Royal Hospital, Haslar.

HISTORY of the case sent with the patient; with the subsequent symptoms and treatment pursued by Dr Mortimer, the senior surgeon under whose care he was placed.

George Weldon, aged 37, seaman, lost his footing yesterday evening, the 20th of July 1838, about nine o'clock, and fell backwards on his head on the deck. I found him immediately afterwards complaining of a severe pain in the back part of his neck and between the shoulders, and of pain and numbness in the arms. His face was pale, and his pulse weak. Five grains of *Carb. Ammoniae* in an ounce of camphor mixture were administered, after which he rallied. He is worse this morning, complaining of numbness, not only in the arms, but also in the legs; of the pain in the back part of the neck being more severe, and of inability to turn or move in any direction. As the ship is in dock, it is thought advisable to send him to Haslar Hospital for the benefit of hospital treatment. Signed, JAMES M. DEAS, Assistant Surgeon, H. M. S. Pique.—July 21st 1838.

Admitted into the Haslar Royal Naval Hospital, on the 21st of July 1838, at eleven A. M. in a state of perfect consciousness, without wound, or external appearance of bruise. Both arms are commencingly paralytic, the left the most so. The accident occurred yesterday evening, since which he has not passed urine, nor have the bowels been opened; the pulse is slow, weak and oppressed; pupils unaffected; nor does he refer to any complaint, save about the muscles of the neck and shoulders.

His breathing is undisturbed. The catheter was introduced; a draught of infusion of senna was immediately given, and an enema was administered. Evening, a free evacuation from the bowels had taken place; but the pulse was quick and sharp. The enema was repeated; and twenty ounces of blood were drawn from the arm.

22d July, Respiration is hurried; the pulse is weak; there are continual attempts to expectorate a frothy mucus, but the attempt is ineffectual; was most anxious to inhale air; he desired to be raised higher in bed; this is accomplished with facility, by the rude yet excellent apparatus of Borthwick.

The enema was repeated; the urine was withdrawn by catheter; and six grains of calomel and one scruple of jalap were given in the form of bolus.

Noon, He is easier, he breathes more uninterruptedly, but the pulse flags. Evening, Respiration laborious; death is approaching. Died at half-past four o'clock on the morning of the 23d, exactly fifty-five hours and a-half after the accident, and forty-one hours and a-half after his admission into this hospital.

*Post-mortem.*—On the posterior surface of the body, extending from the occiput to as far as the sixth or seventh dorsal vertebra, there was considerable ecchymosis; and in making a section of the integuments and subcutaneous cellular tissue, a quantity of blood was found effused into its texture. In prosecuting the dissection further, especially in a space reaching from the first cervical to the second dorsal vertebra, coagulated blood in great quantity was found surrounding the muscular fibres, a number of which were ruptured and softened. These being sponged away, a little more careful dissection exposed to view a considerable displacement backwards, of the fifth from the sixth cervical vertebra. All the blood was sponged and cleared away, and as much of the soft parts removed as was possible, for the purpose of ascertaining the exact position of the dislocated vertebra. It was then found that the little finger could easily be passed underneath it, into the spinal canal; and that the body of the fifth pressed severely on the spinal chord, and rested on the laminæ and spinous process of the sixth cervical vertebra. The spinal column was now removed (sawing through the angles of the ribs) at the seventh dorsal vertebra. It was then ascertained beyond all doubt, that the injury was a complete dislocation without fracture. The ligaments and intervertebral substance were all ruptured; and when suspended from above, the parts were held together by the vertebral arteries and spinal marrow, with its theca alone, the *theca vertebralis* being uninjured.

*Head.*—The cranium was thick and very heavy; the thinnest part measuring two lines and a-half, and the thickest five lines and a-half. The great longitudinal sinus was gorged with blood, and so large as to admit with ease the forefinger. The medullary substance of the brain was soft and very vascular. When the section of the *centrum magnum ovale* was made, it was found studded with spots of red blood. No other abnormal appearance was observed until an attempt was made to remove it, when it was found impossible to pass a knife through the *foramen magnum*, to make a section of the *medulla oblongata*. The brain was, however, removed, and it was then ascertained that the *foramen magnum* was so much contracted, as scarcely to admit the point of the little-finger.

On closer inspection, and after dissecting off the *dura mater* in this situation, the constriction was evidently produced by the odontoid process of the axis being much larger than natural, and projecting in a conspicuous manner, upwards towards the base of the brain, and backwards on the *medulla oblongata*, which, from the little that was attached to the *pons Varolii*, appeared small and nearly flat. By applying the saw at the posterior margin of the *foramen magnum*, and carrying it obliquely forwards and upwards, a section of the base of the cranium was now made for the purpose of ascertaining the exact condition of the odontoid process, and the beautifully arranged ligaments in this situation. The section being completed, and a little dissection made, it was ascertained that the whole of the cervical vertebræ, from the atlas down to the seat of dislocation, were completely ankylosed. Not the least vestige of ligamentous structure could be observed, with the exception of the capsular and occipito-atlantal ligaments, forming the articulation between the occiput and atlas; and of these, the capsular ligaments and synovial membranes, when cut into, were found to be so much thickened and altered in structure, as more to resemble cartilage than ligament, and calculated to impede seriously, if not altogether, the nodding actions of the head and slight lateral motion, which this articulation permits. No trace could be found whatever of the *apparatus ligamentosus*, and lateral ligaments, connecting the occiput with the atlas; neither was there any thing remaining in the form of the ligaments which complete the articulation between the atlas and axis; but nature, ever bountiful, had formed a beautiful provision for the absence of the transverse ligament by an isthmus of bone, extending from the anterior aspect of the odontoid process to the posterior concave surface of the anterior arch of the atlas, thus, in most respects, answering every purpose for which the transverse ligament is known, although placed in a situation diametrically opposite.

After the usual process of maceration the bones appeared white, and exceedingly compact in their tissue, and, with the exception of their ankylosed condition, are perfectly normal ;—their form in every respect not appearing to differ from the general characters by which these vertebra are known.

The most remarkable feature in the whole preparation, and evidently the result of a former dislocation forwards, is the position of the atlas ; which, on the right side especially, is pushed forwards and upwards from off the articulating surface of the axis, so as to cause the odontoid process to present itself nearly in the centre of the circle of the atlas. A bridge of bone exactly half-an-inch in length, and varying from three to four lines in breadth, passes nearly horizontally forwards, from the odontoid process to the atlas, as described above, and connects them together. The axis is also pushed forwards in the same manner from the third cervical vertebra, but not to so great an extent, giving the entire preparation a twisted appearance to the left side. Its length, measuring anteriorly, from the superior margin of the ring of the atlas to the inferior margin of the body of the fifth cervical vertebra, is three inches and a-half. The diameter of the spinal foramen of the atlas, from behind forwards, is exactly one inch and four lines, and the transverse diameter one inch and half a line. The odontoid process, instead of terminating at its apex in a point, as it generally does, presents a broad and irregular ovoid form, measuring transversely half an inch, and from behind forwards, including the bony bridge alluded to, one inch: its length is three-fourths of an inch, and its distance from the posterior arch of the ring of the atlas only four lines.

*Remarks.*—It may be supposed, that, having ascertained the exact nature of this accident, the author of this paper was very anxious to obtain every particular relating to this man's history ; and as the Pique was still riding at Spithead, he took the earliest opportunity of going on board, for the express purpose of gaining all the information possible ; and he has to thank Mr Deas, the Assistant Surgeon, for his kindness in furthering his views on that occasion.

It appears that the man had, for some years past, always been subject to a stiff-neck, that he very often complained of rheumatic pains in that region, and of sore throat. He was, nevertheless, a very efficient and active seaman, always doing his duty, and never on the sick list ; but was unable to move his head to one side, and was compelled to turn his whole body round when he was desirous of looking either to the right or to the left. It further appears that, at the time the accident occurred, the deceased, although not drunk, was in the state that sailors call "rather fresh," and was "larking" with some of his messmates, and in attempting to catch one of them, his foot slipped, and he fell backwards, his head only slightly striking the deck.

Complete dislocation of the vertebræ, without fracture, (if the first and second cervical be excepted,) is so very rare, that the occurrence of such an accident is doubted, and even positively denied, by some of our best surgeons. It is very desirable therefore that well authenticated cases should be published. Sir Astley Cooper, in his work on Dislocations, appears to doubt the possibility of a complete dislocation, without fracture, though he does not deny that such an accident may occur. Delpech, Boyer, and some others, assert that it is utterly impossible; and the latter gentleman gives some very sound anatomical facts, in regard to the construction of the articulations, for his reason in disbelieving it.

There are, however, several undoubted cases on record; and Mr Lawrence, Surgeon of Bartholomew's Hospital, has published a case, if the author's memory is correct, in the Medico-Chirurgical Transactions, that ought to convince the most sceptical. Sir Charles Bell has also published, in his work on Injuries of the Spine and Thigh Bone, a case of complete dislocation of the last dorsal from the first lumbar vertebra, (in a child that was knocked down by a stage-coach,) with entire division of the spinal cord. This patient survived, and was taken from the hospital, and died thirteen months afterwards from croup: there was, however, a small portion of the bone broken off.

Professor Rust has also recorded a case of dislocation in the cervical region, which was replaced by himself. The injury occurred in consequence of a severe fall on the head. The neck was completely bent to one side, the upper extremities paralysed, and attacks of convulsions and hiccough supervened. Replacement was attempted, and succeeded. The patient was made to sit on the ground, and the head drawn straight upwards by an able assistant,—and the cure was completed by the local application of cold.

Ehrlich has recorded a most remarkable case of dislocation of the atlas. A young man, 16 years of age, fell in carrying a sack of flour upstairs, and his head was forcibly bent forwards by the burden. He was found senseless; with livid countenance, prominent eyes, tongue hanging out of the mouth, with slow and interrupted respiration, and pulse scarcely preceptible. The limbs were motionless, and apparently paralysed; urine and fæces passing involuntarily; the head was inclined to the right side, and had lost its firmness, so that it fell by its own weight from side to side, when unsupported. The articular process of the second vertebra projected on the left side. Ehrlich considered it a dislocation with pressure on the spinal cord, and caused extension of the head to be made, while he endeavoured to force back the atlas, and bring the second-vertebra forwards.

After some effort, the replacement was effected with a snap:—the head now became steady, and the arms moved; but the patient remained insensible, with dilated pupils: the respiration and pulse were improved; and, on the next day, consciousness returned. A good deal of swelling of the neck and ecchymosis came on, but soon subsided, and after ten or twelve days he quite recovered.

In all the accounts, however, which the author has read, he notices, that the direction of the displacement, when resulting from accident, has been forwards and upwards, and not, as in this case, backwards and downwards.

That the ankylosis of the cervical vertebræ, above the seat of the injury, may not have had some influence in producing this anomaly, is left to the more matured judgment of the elder members of the profession; though the writer is certainly disposed to think, that the direction of the dislocation, and the accident also, may be accounted for, in a great measure, by their abnormal condition. It appears very doubtful, that the slight fall which this man got, could, under ordinary circumstances, have produced such extensive and fatal injury.

With regard to the ankylosis, in this instance;—there are a number of cases on record, very similar, though not to so great an extent. Wynperse and Boyer have both met with cases of dislocation of the occiput upon the atlas, and of the latter upon the second vertebræ, with ankylosis. Daubenton mentions a very remarkable case of this kind, where the second vertebra of the neck was pushed so far back as to leave only an interval of three lines between the odontoid process and the posterior arch of the atlas; the second vertebra, at the same time, inclining towards the right. It certainly appears surprising that serious and fatal symptoms should not supervene, when we consider that the spinal marrow must inevitably be compressed in a very great degree; and it is a matter of astonishment, how a patient could possibly live sufficiently long for ankylosis to be completed.

In this case, related by Daubenton, the distance between the odontoid process and the posterior arch of the atlas is one line less than in the case related above.

Professor Sandifort, of Leyden, has described a case where there was displacement of the atlas and axis, with ankylosis of these two bones to each other, and to the occiput: he describes also several others, chiefly of ankylosis, between the occiput and atlas.

There is one remarkable case recorded by him, where the occiput, all the cervical, and the two superior dorsal vertebræ were ankylosed: but the articulating processes and laminæ only were implicated; the bodies of the vertebra being still connected by their fibro-cartilage.

We have also in the museum, at Haslar, a specimen of entire ankylosis of the second and third cervical vertebræ to each other; but there does not appear to have been any displacement.

There is another preparation, showing the commencement of ankylosis in the dorsal region, at the articulating processes.

It would appear, therefore, that a more extensive case of complete ankylosis, than the one now under consideration, has not yet been authenticated and published. There can be no doubt that the primary disease has been ulceration of the cartilages, spontaneous dislocation of the first and second cervical vertebræ following. Professor Rust, of Vienna, has given the best, if not the only account, of this disease:—first, in the Saltzburg Medico-Chirurgical Journal, in 1813, and afterwards, more elaborately, in his work on Diseases of the Joints, published in 1817.

The first symptoms of this disease, according to him, are, pain in the neck becoming more severe at night, or in swallowing a large mouthful, or drawing a deep breath. The pain affects one side of the neck, especially when the head is moved towards the shoulder; it extends from the larynx towards the nape, and often to the scapula of the pained side.

No external alteration is perceptible; but firm pressure on the region of the first and second vertebræ produces considerable pain, and thus points out the seat of the disease. The difficulty of swallowing, and breathing, and hoarseness, increase, alternating with pain in the neck, which seems to fix about the back of the head, and becomes intolerable on moving that part. The head sinks towards one shoulder, the face being turned a little down; for, in general, the articulations are affected on one side only, and that was the left, in seven out of nine examinations, after death. If both sides are affected, the head will incline directly forwards. In this state things continue for several weeks or months; and, before worse symptoms come on, there is often apparent improvement, freer motion, and more natural situation of the head. But the uneasiness in speaking and swallowing returns; the pain becomes more severe and extensive; the head falls a little backwards, and sinks towards the opposite side. The patient feels as if the head were too heavy, and he carefully supports it with his hands, when he moves from the sitting to the lying position, or *vice versa*. This may be considered a pathognomonic symptom of the affection. Another symptom, which, at this period, shows the true nature of the disease, is a peculiar expression of pain in the countenance; which, combined with the position and stiffness of the head, constitutes so characteristic an assemblage of appearances, that it is enough to have seen it once, in order to recognize it again immediately. In the further progress of the case, noise in the head, deafness, giddiness, cramps, and convulsions, partial paralysis, particularly of the upper limbs, loss of voice, purulent expectoration, and hectic symptoms supervene, Generally, no external change is observable, either in the neck, or in the cervical region; and Rust observed, in one case only, swelling of the affected side, which broke, and left fistulous ulcers.

But the slightest pressure in the region of the three upper vertebræ is acutely painful; and, sometimes, in the advanced period of the disease, a grating of rough surfaces is distinctly perceived, when the head is turned. The patient may continue for months in this helpless and painful state, and then dies, either from exhaustion or debility; or, which is more frequent, suddenly and unexpectedly. Experience has furnished very little satisfactory knowledge in regard to the treatment of this disease.

Blisters, setons, and issues, have been tried; but Rust found these remedies only capable of retarding the progress of the disease, and producing little or no abatement in the symptoms. The only cure is that effected by nature; and the best treatment appears to be that, where such a position, and quietude of the patient is adopted, which favours its terminating in ankylosis.

It appears rather strange that the ankylosis should have terminated so abruptly in this case. There was no appearance whatever of a disposition to change in the articulation between the 5th and 6th vertebra, the seat of dislocation; the ligaments in this situation (although ruptured) were distinctly capable of being made out, and those immediately succeeding are perfectly normal, with the exception of the *ligamenta subflava*, in the dorsal region, where there are evident symptoms of ossific change.

### *Description of Plate* IX.

*Fig.* 1.—Represents a posterior view of the preparation; showing the displacement of the atlas, and position of the odontoid process, and ankylosis of the oblique processes.

*Fig.* 2.—Lateral view, showing the displacement of the atlas, and ankylosis of the articulating processes and bodies.

*Fig.* 3.—Anterior view, showing the entire ankylosis of the bodies, and the twisted appearance given the preparation in consequence of previous spontaneous dislocation.

*Fig.* 4.—View of the preparation placed on its anterior surface, showing the displacement of the atlas, the position of the odontoid process, the bridge of bone extending from it to the atlas, and the narrow space for the transmission of the *medulla spinalis.*

## Art. X.—*On the Action of Poisons.* By James Blake, Esq. M. R. C. S., F. R. M. C. S.

In directing the attention of the Society to a point, which, during the past century, has been so fully discussed by physiologists, it might be supposed that I should find a difficulty in bringing forward anything which may be worthy of its notice. But, far from being exhausted from the labour that has been bestowed upon it, the subject of the action of poisons on the animal economy, still presents to us one of the richest fields, from which we may obtain facts for the advancement of that branch of knowledge, on which medicine, as an inductive science, must be founded. The effects produced by poisons are, in fact, but the most striking instances—the extreme cases, in a series of phenomena, which comprehends not only the entire destruction of the functions of an organ, but even the slightest modifications which these functions may receive. It is not the mere explanation of a few isolated phenomena that is embraced by this part of physiology, for the prospects that its pursuit presents to us are, perhaps, as unbounded as any that ever excited the imagination of a Paracelsus, the vista it opens to our view, promises apparently to conduct us farther into the arcana of nature, than the daring of Prometheus would have led him.

But if such are the fruits that are to be obtained from the cultivation of this branch of science, how is it, it may be justly asked, that the labour which has been already bestowed on it, has produced such slight results? and to what must we attribute the want of success that has hitherto attended its investigation? Fortunately for the future prospects of science, this sterility can be proved to be owing to the unphilosophical manner in which the subject has been pursued, rather than to any inherent barrenness of the soil. If, after two centuries of research, physiologists are not yet agreed on the most fundamental, and apparently the most simple questions connected with this subject, it is not that it presents to us problems which are above our reason to solve, or phenomena which are not amenable to those laws which govern the universe; but it is in the method by which these researches have been conducted, that we shall find an explanation of the want of success that has attended them. Instead of proceeding with the utmost circumspection in the investigation of phenomena so complicated as are those offered by the animal economy, the physiologist has neglected the most simple and fundamental rules of philosophizing, in a science where these rules are most necessary; he has cast aside the chart which should guide him in the research of truth, at a moment when he is about to enter on a course, surrounded by rocks and quicksands.

In proof of these assertions, I have but to refer to the unphilosophical attempts which were made towards the end of the last century, to explain the action of poisons on chemical grounds, although physiologists possessed not the slighest knowledge, either of the chemical composition of the substance they experimented with, or of the fluid they supposed changed by it. Were I to select an instance from our own times, I have but to mention the fact of memoirs having been written to prove, that poisons do not act by their direct contact with the nervous centres, because sufficient time did not elapse after their application, to allow of their reaching these centres, before symptoms of the action were manifested; and yet this argument was brought forward with an utter ignorance of the most important data on which it could be founded, namely, the time required for the blood to circulate from one part of the system to another. Another instance connected with this subject of the unphilosophical mode of advancing hypotheses is furnished us by Müller, (See Müller's Physiology, by Bayley, p. 247, Vol. i.) who, admitting that poisons act only when applied to the nervous centres, yet, finding that effects are produced more rapidly than the erroneous views he entertains of the rapidity of the circulation would render possible, supposing they were only conveyed by the blood, advances the explanation, that it is by permeating the animal tissues that they arrive at the brain. The most simple experiment, or the slightest consideration of the physical properties of these tissues, would have been sufficient to convince him that such could not be the case.

When such has been the spirit in which this branch of physiology has been pursued, can we be astonished that but little light has been thrown upon it? It is, indeed, a curious fact, that two hundred years after the promulgation of the system of Bacon, a spot is to be found on the field of science, from which the dark shadows of the scholastic philosophy have not yet been dispersed. It is only within the last few years, that physiological investigations have been undertaken in a truly scientific spirit; or in the aim of becoming acquainted with the more simple and tangible phenomena connected with organized beings, before attempting to elucidate those of a greater degree of complexity. The success that has attended the researches of Magendie on the physical properties of the tissues, of Poiseuille on the circulation, and of Müller on the structure of the glands, is but a striking proof of how great was our ignorance on the simplest and most elementary facts. But to return to the subject of this memoir.

The action of poisons presents to us, as does every physiological problem, a dynamical and chemical question. The former is evidently the first to be solved, as attaching itself to a branch of science more simple, and of a higher degree of generality than chemistry. In the question before us, the dynamical problem relates to the determination of the part of the animal economy on which the poison produces its effects. This may be either on the part to which it is directly applied, or after it has entered the blood-vessels, or only when it is brought into contact with the brain and nervous centres. This question, it will be perceived, is quite independent of the other or chemical one, which involves the molecular changes produced in the blood, or in the tissue on which the poison acts, and must be solved before the latter can be entered on with any chance of success. It is the former or dynamical question which I now propose to investigate, having lately published some observations relating to the chemical part of the subject, in a memoir read before the Royal Society in February last. In a paper which was read before the Royal Society in August 1839, (See Edin. Med. and Surg. Journal, No. 142,) I have already treated this subject under its dynamical point of view, and before proceeding, I shall take the liberty of transcribing a short summary of the result of the experiments contained in that memoir.

" *1st*, That the time required* by a substance to permeate the capillary vessels may be considered as inappreciable.

" *2d*, That the interval elapsing between the absorption of a substance by the capillaries, and its general diffusion through the body, may not exceed nine seconds.

" *3d*, That an interval always more than nine seconds, elapses between the introduction of a poison into the capillaries or veins, and the appearance of its first effects.

" *4th*, That if a poison be introduced into a part of the vascular system nearer the brain, its effects are produced more rapidly.

" *5th*, That the contact of a poison with a large surface of the body, is not sufficient to give rise to general symptoms, as long as its general diffusion through the body is prevented."

Notwithstanding the proofs I then brought forward, to show that the application of a poison to the nervous centres was necessary before it produced any general symptoms, still there was one class of experiments which I had not then tried, but which were calculated to furnish the strongest evidence, for or against the position I had supported. It is evident, that, if a poison acts only when applied to the nervous centres, in different sorts of animals, it must require a longer or shorter time before it shows any symptoms of its action, according as the circulation is more or less rapid, or as the course it has to run before arriving at these centres, is longer or shorter. As my former experiments had been performed only on dogs, I was, at the time of the publication of the memoir above alluded to, unable to furnish any data on this point. In the present communication, however, I hope to add this important link which was wanting in the chain of evidence on which my position was founded. The experiments I have now the honour to lay before the Society, have been performed on horses, rabbits, and fowls,—animals offering us the extremes as to rapidity of circulation, at least of those animals which are readily available for these researches. As the time required for the blood to circulate from one part of the body to another, had not been determined for any of these animals, with the exception of the horse, (on the circulation of which, however, the experiments of Hering are not of the most conclusive nature), I have, in every instance, endeavoured to ascertain this important element in the investigation. My experiments on horses have not been numerous, but they were such as I could place full confidence in, and supported, as they are by the previous researches of Hering, I can, without hesitation, lay them before the public.

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* In regard to the statement as to the time required for substances to be diffused through the body, I would observe that all my experiments have been performed on full-grown dogs. It is probable that these observations might require to be slightly modified in applying them to other animals. It is also evident that a difference must exist in the time occupied by a substance in reaching the capillaries in different parts of the body. The time here given, or nine seconds, is that in which I conclude a substance may be applied over the greater part of the body, more particularly to the central parts of the nervous system. It would appear that seven seconds may suffice for its being conveyed to the capillary terminations of the coronary arteries.

*Expt.* 1. A tube was inserted into the jugular vein of a horse, and another into the carotid artery; with the latter, the hæmadynamometer was connected, in order to ascertain the pressure in the arterial system, and thus to have a direct indication of any change that might take place in the action of the heart.*

A solution, containing half an ounce of nitrate of potass, a salt which possesses the property of arresting the action of the heart,† dissolved in five ounces of warm water, was injected into the jugular vein. In sixteen seconds after the introduction of the salt into the vein, the action of the heart was arrested, as was shown by the rapid descent of the mercury in the hæmadynamometer; no pulsation took place after this. The animal struggled violently some time after the action of the heart had been arrested, and respiratory movements continued three minutes and a half after the injection of the poison. The interval that elapsed between the introduction of the poison into the vein, and the arrest of the action of the heart, furnishes the time required for the blood to pass from the jugular vein to the capillary terminations of the coronary arteries; or, at least, for a solution mixed with the blood, to pass over this space, it being necessary probably to make a slight allowance for the diffusion of the fluid, independently of the onward motion of the blood.

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* Immediately before the injection, the pressure in the arterial system was equal to a column of mercury of from 6.5 to 7.5 inches; a pressure which Poiseuille generally found to exist in the animal.

† See Archives Generales de Medecine, Nov. 1839.

Analogous experiments have been performed three times. In one instance in which the animal had lost a great deal of blood, the action of the heart was not arrested until twenty seconds after the injection of the poison. In another instance it was again sixteen seconds.

*Expt.* 2. The following experiments strikingly confirm the above result. The object of it is, to ascertain the time in which a substance injected into the jugular vein, will make its appearance in the blood from the carotid artery.* A tube was inserted into the jugular vein of a horse, another into the carotid artery of the opposite side. In order to avoid any of the injections becoming directly mixed with the blood, the animal was thrown on the side on which the tube was introduced into the jugular, so that the side from which the blood escaped was the highest, the poison being injected into the vein. A solution, containing one ounce of nitrate of baryta, dissolved in five ounces of warm water, was injected into the jugular vein. Ten seconds after the commencement of the injection, blood was allowed to escape from the carotid, and received into a vessel, No. 1. during five seconds; another vessel was then substituted, No. 2. and received the blood escaping from the carotid, from fifteen to twenty seconds after the introduction of the substance into the jugular vein. What escaped from the artery after this, was received in a third vessel, No. 3. The heart, however, had already stopped when the last vessel was applied. These different specimens were carefully analysed; no trace of baryta could be obtained from the blood in No. 1. or that which escaped from the artery, between ten and fifteen seconds after the injection of the poison. In the blood from No 2, baryta was readily detected; and although an accident during the analysis led to the loss of a portion of it, it still yielded a much greater quantity in proportion to the quantity of blood, than did the contents of No. 3, or the blood obtained from the carotid subsequent to twenty seconds after the injection of the salt into the veins, thus proving that the blood which was most strongly impregnated with the poison, escaped from the carotid between fifteen and twenty seconds after the introduction of the salt into the vein. From the large proportion of the salt in the blood that escaped during this interval, we must conclude, that the moment at which blood containing the salt, first began to escape from the artery, must have been about sixteen seconds after its introduction into the veins. On account of the tube in the carotid being rather small, I think it probable that a second or two might have been lost, from this cause, the blood not being able to escape with sufficient freedom.

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* The same thing has been already done by Hering as regards the time for blood to pass from the jugular vein of one side to that of the other, after having gone the round of circulation. The modifications which I have introduced into his experiment renders it, I think, more accurate.

It will be seen that these experiments agree very closely with those performed by Hering, who found, that in the horse, the round of the circulation was completed in twenty-five seconds. Having thus clearly determined the velocity of the circulation, it remained to ascertain the time required for a poison which acts on the nervous system, to produce its effects. It is evident, that, should its action be due to an impression produced on the nerves of the part to which it is directly applied, no appreciable interval should elapse between its application, and the appearance of symptoms of its action. If, on the contrary, a poison affecting the nervous system, only acts when applied directly to the nervous centres, it is equally evident, that no symptoms of its action should manifest themselves until, at least, sixteen seconds after its application, this being the shortest period in which blood with which it has been mixed, (supposing the poison injected into the jugular vein,) can be brought into contact with any part of the nervous centres. The substance I made use of was strychnia, as I have found it to act more rapidly than any other poison, not excepting woorara and conia.

*Expt.* 3. A tube was inserted into the jugular vein of a healthy horse, the animal being ordered to be killed on account of some disease of the foot, which had not at all affected its general health. Immediately before the injection, the pulse was about 50. The animal was not confined, so that the slightest symptoms of the action of the poison might be immediately recognized. A solution containing six grains of crystallized strychnia, dissolved in three ounces of warm water acidulated with nitric acid, was injected into the jugular vein; sixteen seconds after the injection of the poison, the first symptoms of its action showed themselves by a slight convulsive movement of the superficial muscles of the thorax; seventeen seconds after the injection, the animal fell as if it had been a dead mass; every muscle in the body was in a violent state of spasm; the animal lay in this state for about a minute and a-half; convulsive movements then came on, and lasted until death, which took place about four minutes after the injection of the poison.*

In this experiment, the poison, although administered in a very large dose, did not produce the slightest effect on the animal, until sixteen seconds had elapsed after its introduction into the vein, and it required seventeen seconds before any marked symptoms of its action manifested themselves. It will be seen that this is the time required for the blood to pass from the jugular vein to the termination of the coronary arteries; and may also suffice for it to reach the arteries distributed to those parts of the spinal chord, nearest the heart. I know not if the earlier occurrence of convulsive movements in the muscles of the thorax, can be connected with the poison having first reached that part of the chord from which these muscles receive their nerves.

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* I with pleasure avail myself of this opportunity of publicly thanking M. Boulay fils, of the Royal Veterinary College of Alfort, for the kindness with which he afforded me opportunities of conducting some experiments on horses, at that establishment. I have also to express my sincere thanks to Drs Kemp and Gilbert for their valuable assistance whilst conducting many of these experiments.

I shall now notice experiments that have been performed upon dogs in connection with this subject. As a full account of these experiments will be found in the 142d No. of the Edinburgh Medical and Surgical Journal, I shall merely allude to the more important results they furnish, referring to my former paper for details. It appears that in dogs, the time required for the blood to pass from the jugular vein to the termination of the coronary arteries, varies from seven to fourteen seconds; in full-grown, middle-sized animals, the shortest time in which a poison, acting on the nervous system, has shown symptoms of its action, after it had been introduced in the jugular vein, is twelve seconds.

The following experiments, which have been performed on birds, furnish us with interesting data, on the connection which exists between the rapidity of the circulation, and the time required for a poison to act.

*Expt.* 4. As the velocity of the circulation in this class of animals is a point which has not yet been determined, I shall relate an experiment undertaken with the view of ascertaining this fact. The means I employed were the same as those I generally use, viz., the injection of a substance into the jugular vein, which possesses the property of arresting the action of the heart when circulated over its parietes, the hæmadynamometer being connected with the arterial system. On injecting a drachm and a-half of a solution of nitrate of baryta, into the jugular vein of a fowl, the action of the heart became arrested in six seconds, as was proved by the rapid descent of the mercury in the hæmadynamometer.*

Having thus ascertained the time required for the blood to pass from the jugular vein, to the capillary terminations of the coronary arteries, the following experiment was performed, to show the time in which a poison when introduced into the vein, gives rise to any symptoms of its action.

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* On opening the thorax immediately after death, the heart was found motionless with scarlet blood in the left cavities, showing that in this class of animals the salts of baryta exert the same effect on the heart as in quadrupeds. Another interesting phenomenon noticed in this experiment, was the continuation of muscular movements for some minutes after death; a phenomenon which is characteristic of the salts of baryta and those substances which are isomorphous with it in their action on quadrupeds. In performing this experiment, I had also an opportunity of observing the pressure of the blood in the arterial system of the bird; a fact which has not, as I am aware of, been previously ascertained. It was found equal to a column of mercury of from four to five inches. In the goose the pressure was equal to a column of mercury of six inches, the circulation being rather slower, as ten seconds were required for a substance to pass from the jugular vein to the heart.

*Expt.* 5. A solution containing one grain and a-half of nitrate of strychnia, dissolved in a drachm and a-half of warm water, was injected into the jugular vein of a fowl. In six seconds and a-half after the introduction of the poison into the vein, the animal became convulsed, and so rapid was the action of the poison, that in eight seconds after its introduction, the animal lay apparently dead, the only sign of life being a movement of the tail, which continued for some seconds after every other motion had ceased.

The next experiment I have to relate had been performed on a quadruped (the rabbit), in which animal I find the circulation much quicker than in the fowl.

*Expt.* 6. A tube was inserted into the jugular vein of a full-grown rabbit; by which to inject the poison, the hæmadynamometer was connected with the femoral artery. A solution containing three grains of chloride of barium, in a drachm and a-half of warm water, was introduced into the vein; in four seconds, the action of the heart was arrested; violent spasm came on, and the animal died about a minute and a-half after the arresting of the heart's action.*

*Expt.* 7. In another full-grown rabbit, a solution containing half a grain of nitrate of strychnia was injected into the jugular vein; in four seconds and a-half, the first symptoms of the action of the poison showed themselves; the animal fell on its side, and respiration was immediately arrested; in seven seconds after the introduction of the poison into the vein, the animal lay apparently dead. Before proceeding to offer any remarks on the above experiments, I shall endeavour to present the data they furnish us in a tabular form.

| | Time required for the blood to pass from the jugular vein to the capillary terminations of the coronary arteries. | Time that elapses between the introduction of a poison into the jugular vein, and the first symptoms of its action. |
|---|---|---|
| In the horse, . | 16 seconds. . . | 16 seconds. |
| „ dog, . . | 11 to 12 . . . | 12 |
| „ fowl, . | 6 . . . | 6½ |
| „ rabbit, . | 4 . . . | 4½ |

These are the facts which I have now the honour to lay before the society. Derived as they are from direct experiments which have been performed with the utmost care, and solely in the desire of throwing some light on the much disputed question as to the action of poisons, I trust they will be considered as accomplishing the end for which they were undertaken.

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* The pressure in the arterial system immediately before the injection of the poison was equal to a column of mercury of from four to 4.4 inches, the oscillations not exceeding a tenth of an inch at each pulsation of the heart. When the thorax was opened immediately after death, the heart was found motionless, with the exception of slight contraction of the right auricle. The descending cava was contracting vigorously, and continued to do so when all communication between it and the heart was cut off. Muscular movements were observed to continue ten minutes after death.

Before offering any remarks on them, I shall draw up a short summary of the facts contained in this memoir, the interest of which, I think, will be increased, when viewed in connection with the result to which former experiments had led me.

It would appear from the facts above stated, 1*st*, That a constant ratio exists between the time required for a poison to act, and the rapidity of the circulation.

2*d*, That in those animals on which experiments have been made, a sufficient interval always elapses between the introduction of a poison into the vascular system, and the symptoms of its action, to allow of the blood with which the poison has been mixed, reaching the capillaries of the tissue on which the poison exerts its deleterious effects.

To these conclusions I would add, as proved by my former memoirs, that with those poisons which act on the nervous system, the closer the part of the vascular system at which a poison is introduced, is to the nervous centres, the more rapid is its action; and also, " that the contact of a poison with a large surface of the body does not give rise to general symptoms, as long as its diffusion through the body is prevented."

On these facts I now offer a few remarks, although it is far from my intention to intrude on the science any new theories or hypotheses, which, unfortunately for the progress of physiology, are but too easily manufactured; and which, when once formed, are far too dear to their fabricators to be submitted to the rude test of experiment. Had not such been the case, we should not at the present day, 200 years after the immortal discovery of Harvey, be seeking for data on the simplest and most readily ascertained phenomenon connected with the circulation. But to return from this digression.

The first, and perhaps the most interesting inference that results from these experiments, is, that poisons only act when applied directly to the tissues they affect. I am aware that, in making these assertions, I am stamping as erroneous, views which have received the sanction of physiologists of the highest eminence, and which are supported by experiments apparently of indubitable character. In opposition to these experiments, I should be sorry to place my own researches, were not my confidence shaken in observations, which, connected as they intimately are with the circulation, have yet been undertaken without a preliminary knowledge of some of the most important points connected with that function. Had my experiments even been of a nature to call for the assistance of any nervous fluid, or vital force for their explanation, I should have looked with much suspicion on the results they furnished me. But when I find that a careful investigation of facts leads to the rejection of these unphilosophical hypotheses,—when I see a substance producing its effects only where it is present, affecting the heart, only when brought into contact with its parietes, deranging or destroying the functions of the nervous tissue, only when it impregnates it; when, in fact, my experiments tend to cast down some of those barriers which would separate physiological phenomena, from the dominion of laws which govern inorganic bodies, I cannot but hope, that the facts which lead to these views, are simply the expression of truths, destined to receive a further confirmation by the progress of science. That our being able thus to localize the action of a poison is a step made towards the explanation of physiological phenomena, is evident; for when we see that a substance introduced into the blood, primarily affects the functions of an organ by its direct contact with that organ, we naturally conclude that these effects are the result of changes produced in the organ in question, from causes more or less analogous to those which we are accustomed to see acting on other matter; and we are immediately led to seek out what these changes are, as a farther step towards the solution of this important problem. If, on the contrary, we suppose the nervous system primarily affected by an impression made on the nerves of the part to which the poison is directly applied, the solution of the problem becomes removed to a much greater distance, and it even presents itself under a form, which, in the present state of physiology, it would be useless to attempt.

Having thus localized the action of a poison, I shall take a short review of some facts which would tend to throw a still farther light on this important subject, by offering a few observations on the connection which exists between the chemical composition of a poison, and its physiological action. On this subject I can scarcely enter, without incurring the charge of egotism; for I am not aware that any experiments bearing directly on this point have been published by other observers. At the same time it is evident, that, on a field so vast, the labours of a single individual, who is but just entering on the path of physiological inquiry, can have thrown but little light; such, in fact, is the case. The connection above alluded to between the chemical composition of a poison and its physiological action, is but as yet dimly shadowed forth, rather than demonstrated, by the experiments I have undertaken. At the same time, I hope to bring forward sufficient evidence, to prove that in many cases this connection really exists.

In a paper read at the meeting of the British Association at Newcastle, in 1838, I arrived at the conclusion, from some experiments I had performed on the injection of substances into the veins, that those substances which arrested the action of the heart, appeared to agree in one respect, viz. that they all modified considerably the chemical composition of the blood. In a memoir, "Sur l'action de substances salines introduites dans le systeme circulatoire," read at the Academie des Sciences at Paris, in June 1839, (see Archives Generales de Medecine, November 1839,) I stated another interesting fact, tending to connect the physiological action of substances, with their chemical composition, viz. "that, when introduced into the veins, all the salts of the same base exert an analogous effect on the animal tissues, this effect being but slightly modified by the combination of the base, even with the most powerful acids." This fact, however curious in itself, is rendered much more interesting by its forming a corollary to an important law, which subsequent experiments have led me to discover, viz. that, when introduced into the blood, isomorphous substances appear to exert an analogous action on the animal tissues.* Connected as isomorphism is already known to be, with many common chemical properties, and probably with others which yet remain to be discovered, it is interesting to find, that the physiological action of every inorganic compound, is so closely related to certain chemical properties it possesses. There is still another fact to which I would call attention, which is the difference in the general effects produced by poisons on the animal economy, according as they are derived from organic or inorganic compounds. In the numerous experiments I have performed on poisons, derived both from the vegetable and mineral kingdom, I have constantly seen this difference strikingly marked; and it is an interesting fact, that ammonia, which, by its chemical composition, stands, as it were, between the organic and inorganic compounds, should agree with some of the former in its action on the nervous system, whilst its action on the heart and general capillaries, approaches it to potash, with which it is isomorphous.

Such are the facts that would tend to point out a connection between the chemical composition of a substance and its physiological action. I am fully aware that they are at present but few, and form a very imperfect body of evidence on which to establish so important a point; and it is only with the view of directing the attention of physiologists to so interesting a subject, that I have been induced thus to bring them forward. As a physiologist, it has been only under a physiological point of view that I have investigated these phenomena; but I am convinced that they are not destined to receive their full application, until chemistry shall be sufficiently advanced, to throw a light over those complicated reactions which result from the contact of the blood and the tissues, with the various organic and inorganic compounds. I am afraid that this would be a consummation of our hopes, which, in the present age, we are not destined to arrive at; for, however rapid the progress of chemistry has been during the last few years, it is still very far from being able to grapple with those questions, the elucidation of which so much interests the physiologist. For the present, therefore, we must content ourselves with collecting facts on this important subject, confident that we are thus laying the foundation for generalizations, which shall sooner or later place physiology far above the position which it now occupies.

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* The evidence on which this law is founded has been lately laid before the public in a memoir read before the Royal Society in January last, and published in the last number of this Journal.

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## Art. XI.—*Case of Human Monstrosity, with Sketch; absence of the Heart and Lungs.* By Dr Embleton, Demonstrator of Anatomy in the School of Medicine and Surgery of Newcastle.

Whether the woman who bore this monstrosity had a favourable or unfavourable gestation, we do not know. The labour, we are assured, was a laborious one.

The subject is female, and had attained the sixth month of fœtal life, as may be judged from the appearance of those parts which are most developed. Its history, before it was brought to the School of Medicine, is not well known. We found it without placenta or cord in alcohol, in which it had lain for some months; but we are told that putrefaction had commenced before any attempt was made to preserve it.

The external appearances are as follow.

The external organs of generation are well-formed, and the legs of about the usual size in a fœtus arrived at the above-mentioned age.

The head, neck, and shoulders present one mass of deformity, no lines of demarcation existing between the head and neck above, or between the neck and thorax below. The eye-holes are contracted, sunken, and scarcely visible; the eyes themselves cannot be seen. The nose is a small transverse fold of skin, with two perforations below it representing the nostrils.

The ears are two small semilunar folds just behind the orbits; in front of the folds exists the *meatus auditorius externus.*

The mouth is an irregular transverse rima, with thin and flaccid lips, [M]. The tongue is observable within, also the projections of the gums.

The skin over the whole body is much corrugated, and gives a sensation, when grasped between the fingers and thumb, as if it formed but one structure with the soft parts beneath. These are enormously thickened all over, but particularly so about the upper half of the body.

On the right foot are a great toe and three smaller toes. The little toe and that next it are represented by a tubercle, on which are two nails. The third toe is placed behind or above the second.

The left foot has three toes, the external of which has two rudimentary nails. One toe is, however, entirely wanting.

The hands are fixed on the arms, as it were, at right angles. The right hand has three fingers and a thumb, which resembles a dried currant attached to the hand by a thread. It is quite rudimentary. In this hand are to be felt only three metacarpal bones. The left hand has four fingers and a pediculated thumb, like that on the other hand. This hand has four metacarpal bones.

The appearance of deformity of the fœtus is much increased by two enormous pouches, one on each side, which, on being opened, were found to be in the substance of the individual, containing a sort of sero-purulent fluid, and lined by a smooth tissue, having all the appearance of serous membrane. Each cavity is divided into cells; that on the right side into two by a septum placed vertically; that on the left into three by two horizontal septa. The left cavity extends from the shoulder to the top of the head, and from the ear in front to the median line posteriorly, where it is overlapped a little by the other pouch. The right cavity has a similar situation to the other, but is not so extensive. The septa are formed by the lining membrane.

The internal appearances are the following.

A section of the inferior maxilla exhibits a cellulo-cartilaginous structure, with traces in some parts of osseous deposit. There are distinct dental grooves and prolongations of the mucous membrane of the mouth into them, forming dental sacs.

The tongue has the usual appearance, and is attached to the interior part of a cavity representing the pharynx. At the roof of the mouth is the uvula, and behind it the posterior nares. No openings of the Eustachian tubes can be made out. There is no larynx.

The parietes of the cranial cavity superiorly are made up principally of the same semitegumentary, semimuscular structure, which appears to compose the whole of the fleshy parts of the individual. The frontal, parietal, occipital, and squamous parts of the temporal bones can, notwithstanding, be distinguished, intervals being observed to exist between them. The cerebrum is now a pultaceous mass. On this being washed out, the *dura mater*, with its processes, and the arteries ramifying on it, is seen; the *pia mater* and arachnoid are also distinguishable. The opening of the spinal canal, and the processes of the sphenoid, which, although chiefly cartilaginous, yet present traces of osseous structure, are clearly to be made out. All the nerves that pass through foramina in the sphenoid occupy their usual positions before traversing that bone. The carotids can be seen as they enter the scull.

The auricular cavities exist, and the external auditory canal is closed by the *membrana tympana*, connected with which are the bones of the ear.

The orbits seem to be occupied by a membranous structure, in which no trace of the eyeball can be discerned.

On opening the body from the mouth downwards, the first remarkable circumstance is the absence of the heart, lungs, and larynx; a membranous septum representing the diaphragm, and covered on the abdominal surface by the peritoneum, but without any such covering on the thoracic side, and perforated for the passage of a *vena cava*, an aorta, and the œsophagus, occupied about the usual position. The stomach has the usual form and appearance, though perhaps rather small.

The liver is of a peculiar form, presenting three borders and three angles, and an anterior and posterior surface, which are somewhat convex. The organ is exceedingly small; has no division into lobes, nor does it present a lobulated structure; it lies on the right side of the median line, and to represent the right lobe, it is a completely rudimentary liver. Ducts cannot be found passing from it. There is no gall-bladder whatever.

The intestinal tube is nearly normal, though no difference can be discerned between the structure of great and small intestines; nor is there any demarcation between the superior and lower parts of the canal, except the appearance of a cæcum.

The existence of the pancreas is very doubtful.

The spleen is awanting altogether.

The kidneys [K, *K*], have about the usual position, but the right one is anormal. It is like a double kidney. A groove placed vertically along its anterior and posterior aspects, points out the division into two. From the groove on the anterior surface come out the ureter and the renal vein, whilst the artery enters the gland by the groove on the posterior aspect. Perhaps one part is the kidney and the other the renal capsule. On the left side things are in proper position and form. The kidneys do not appear lobulated.

The uterus [U], bladder [B], and rectum [R], have their natural situations. The Fallopian tubes can be distinguished but not the ovaries. The canal of the urachus exists from the bladder to the umbilicus.

The arrangement of the principal arterial and venous trunks will be well understood from the annexed drawing, with references attached by Mr Glover.—Plate VI. Fig. 3.

The intestines have been partly removed and drawn aside.

It may be observed that there are two vessels, occupying respectively the places of the *vena cava* [V], and the aorta, [A], the latter being rather on the left, the former rather on the right side of the spine, and running from one end of the trunk of the body to the other; that each vessel is a continuous uninterrupted tube; and that there is not a vestige of a heart.

The aortic trunk is smaller in diameter than the venous; but its greatest width of size is found to be at that part where it lies between the kidneys. From this to the base of the neck it gradually diminishes in size, and terminates by dividing into two vessels, which represent the carotids. During this course it gives off a number of small branches, (intercostals, &c.), and before its ultimate bifurcation, a branch of some size (subclavian) is given off from each side to the upper extremities.

Where it lies between the kidneys, the calibre of the arterial vessel may be that of a small crow-quill. It here gives off the capsular and renal branches. The right renal passes over the *vena cava*, and enters the posterior groove of the kidney of that side, also a mesenteric branch. Above these is given off an artery, which seems to go to the left side of the trunk. About the lower border of the kidney is given off the right common iliac vessel; the trunk then inclines towards the left side for about two lines, and then divides into four branches, in order from left to right as follows: one, the largest branch is the left hypogastric; another is the left external iliac; the third the left internal iliac; the fourth dips down into the pelvis towards the rectum.

There is no right hypogastric artery. The cœliac axis was not noticed.

The left hypogastric artery [*h*, *a*,] inclines downwards and outwards, and reaches the lateral wall of the abdomen, along which it courses forwards, inwards, and upwards to the umbilicus.

The great venous trunk, or *vena cava*, [V], is observed to be formed at the top of the thorax, by the junction of two veins, one from each side of the head and neck. After receiving the subclavian branches, which, however, were not very distinctly seen, it proceeds downwards on the right side of the spine, and internal to the right kidney to near the last lumbar vertebra. At the upper margin of the kidney it receives the right renal vein, which leaves the anterior surface of the kidney at the groove, and above the ureter. Below this the left renal and capsular veins enter. At the lower margin of the right kidney a large branch is given off, which takes a direction outwards and downwards. Following the same track on the right side that the hypogastric artery was observed to do on the left, it reaches the umbilicus, and there comes in contact with the hypogastric artery from the left side. This branch represents the umbilical vein, and is much larger than the continuation in direction of the *vena cava*, which is found to be made up of the external and internal iliac veins of the left side. The inter-

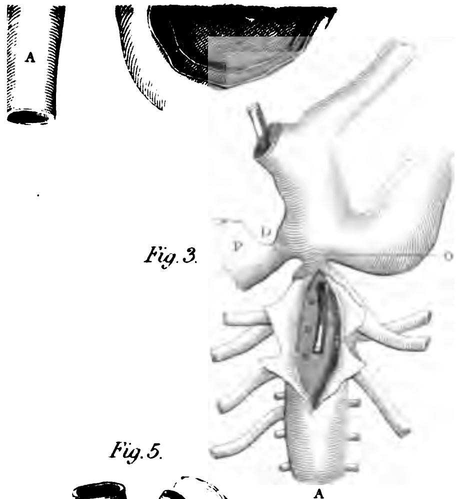


*Fig. 3.*

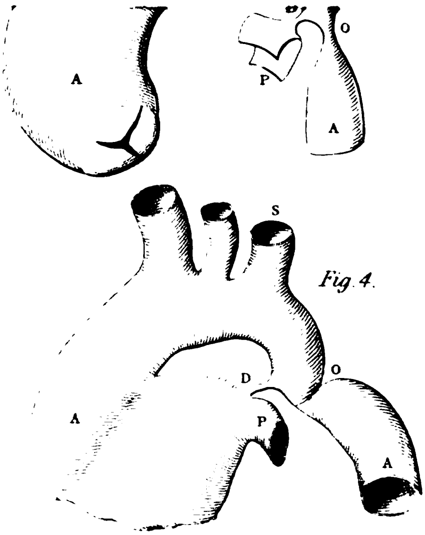
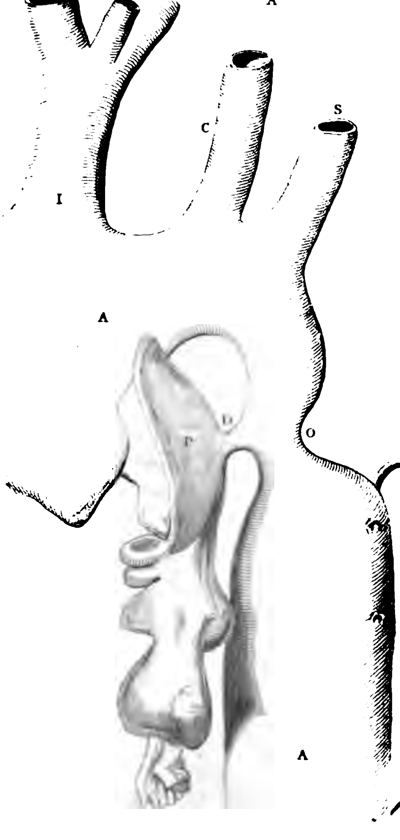


*Fig. 4.*

*Fig. 5.*



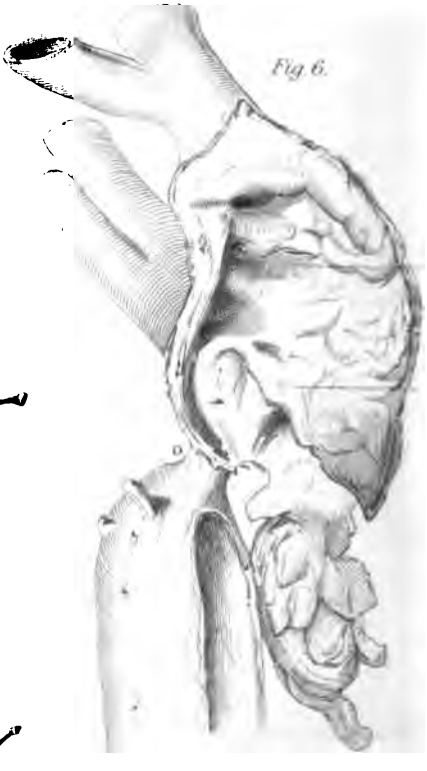


*Fig. 6.*

nal iliac of the right side joins the umbilical soon after this last leaves the lower border of the kidney. The external iliac of the right side mounts up on the posterior aspect of the abdominal muscles, and empties its contents into the umbilical vein a short distance from the umbilicus.

The umbilical cord then is made up of the canal of the urachus, one hypogastric artery, and the umbilical vein; this last, before joining the cord, occupying quite an extraordinary position, that of the right hypogastric artery.

The umbilical vein [U] has no connection with the liver. The venous branches which go to form the *vena portæ* in the natural state here empty themselves into the *vena cava* without passing through the liver. These two circumstances just mentioned show that the liver is here virtually a nonentity.

The state of the vascular system shows, too, that in the highest animals, the circulation can be for a time carried on without any heart at all.

The muscular structure is exceedingly imperfect, but some fibres of the *quadratus lumborum*, *latissimus dorsi*, and muscles of the spine can be detected, also some of the fibres of the abdominal muscles. The muscles of the extremities were not examined.

In the nervous system no irregularity can be observed. The spinal canal has the usual appearance, and is quite cartilaginous. The cord is covered by its theca, through which the nerves pass in perfect order.

The different joints and bones of the extremities present nothing abnormal, except what has been described.

The sternum and clavicles are present, and the ribs. These last are not attached to the spine, but to a white line on each side, diverging from the spine from above downwards. This white line has the appearance of such a tendon as we find in the course of the abdominal muscles.

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## ART. XII.—*Instance of Obliteration of the Aorta beyond the Arch, illustrated by similar cases and observations.* By DAVID CRAIGIE, M. D., &c. Physician to the Royal Infirmary.

SARAH LYON, a girl aged 7, was the daughter of a woman of the name of Janet Paterson, aged 34, who was admitted into one of the permanent fever wards of the Royal Infirmary on the 1st September 1840.

From the circumstance of the father being in one of the male wards labouring under fever, and the extreme destitution of the family, three girls and a boy were brought into the house in the course of a few weeks afterwards. The subject of the present notice was

admitted upon the 12th of October, in consequence of the appearance of various febrile symptoms the previous day. These symptoms consisted principally of rigors, pain in the head, back, and limbs, sore throat, cough, rapid and difficult respiration, and some pain in the left side of the chest.

At the time of admission, she complained of pain in the belly, especially in the epigastric and umbilical region; headach and pain in the back and limbs. The skin was hot and dry; there was considerable thirst; the soreness of the throat continued, and a faint eruption of minute spots was visible upon the chest; the bowels were constipated; the tongue was covered with a thin white fur; the pulse was 140; and the respiration between 30 and 40.

She was directed to get one colocynth pill; to take half-an-ounce of the saline ammoniated mixture every hour; and to have the hair removed.

Next day there was little change in the symptoms. The bowels had been freely moved; but the skin was hot and dry; the respiration continued rather quick and laborious, and the pulse was not reduced in frequency. Treatment was continued for three days more much in the same way, with the view of abating the febrile action, and diminishing the congestion in the lungs. The symptoms of the latter disorder, however, continued to increase, and on the 17th, the respiration was above 40, and the pulse was 140, sharp; and there was great heat of skin; constant motion of the chest and the *alae nasi;* and the beats of the heart were performed with a strong violent impulse, which shook the whole chest, and with a peculiar thrilling sound intermediate between the bellows sound and the smart blow of a hard body inside of the chest.

Five or six ounces of blood were directed to be drawn from the arm, according as the patient bore it.

Sunday, 18th October. The blood was drawn according to direction, without producing faintness; but no amendment of the symptoms took place, and the patient died this morning at two o'clock.

The body was inspected upon Tuesday, the 20th of October, and presented the following appearances.

The body weighed 2 stones, 10 lbs. and 2 oz. Two ounces of fluid were found within the cavity of the chest. The bronchial glands were much enlarged, firm, and fleshy. A considerable quantity of muco-purulent fluid was found within the bronchial tubes of the right lung, and when this was removed, the bronchial membrane was observed to be red, rough and villous. The right lung itself was considerably gorged with blood, slightly solidified, but not sinking in water as hepatized lung; it was free from tubercles. At one point, towards the inferior margin of the lower lobe of the right lung, a small part presented the dark-coloured hemor-

rhagic hepatization; the anterior part of the lung was emphysematous.

The bronchial tubes of the left lung were filled with muco-puriform fluid, and the bronchial membrane was reddened and villous.

The left lung was splenified, and of a bluish colour, but not sinking in water. At its lower part, there was a dark bloody-coloured spot, slightly indurated and friable. The anterior part of the lung was white and emphysematous.

The pericardium contained within it about two ounces of serous fluid.

The heart was very much enlarged in all its dimensions, and weighed ten ounces. The walls of the right ventricle were very much indurated, and did not collapse. The septum projected into the right ventricle, so as to form a convexity into its cavity. The walls of the left ventricle were firm, indurated, and ten lines thick in the middle part. The inner membrane was pale or whitish, thick, and firmer than natural, and irregularly warty.

The inner membrane of the aorta was thick, irregular, shrivelled, and opaque, and the valves were much firmer than natural.

The arch of the aorta was considerably enlarged and dilated; and its coats opposite to the origin of the innominata were thick, firm, and very hard. On slitting open the arch, it was found that the whole inner coat on the right side of the origin of the innominata consisted of a large patch of solid bone, not less in superficial extent, and rather more than a sixpenny piece; and the rest of the artery was thick, irregular, and wrinkled, but not ossified; the patch of bone was pretty thick, and rather irregular upon its surface.

Upon tracing the descending portion of the aorta, it was found to become suddenly much contracted; and about three-quarters of an inch below the origin of the left subclavian artery, it was altogether impervious, and its canal was obstructed. This obstruction did not occupy more than one-quarter or one-eighth of an inch; and immediately below the artery, it presented its usual area; but its coats were there flaccid, and not nearly so thick and firm as those at the arch.

The pulmonary artery was situate on the right side of the arch of the aorta, and adhered to the artery pretty firmly, nearly opposite to the point of obstruction, or slightly above it.

The contracted and impervious part of the aorta was indicated on the outside by a ligamentous structure, and a shrivelled or depressed appearance on the outer surface of the vessel.

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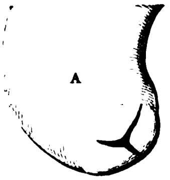
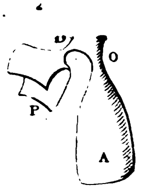




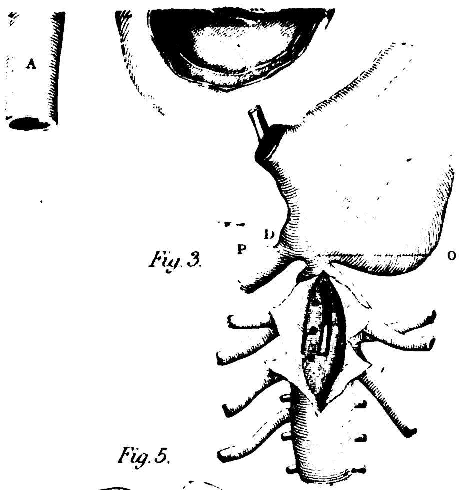


Fig. 3.

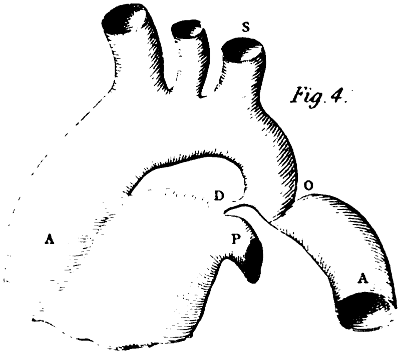
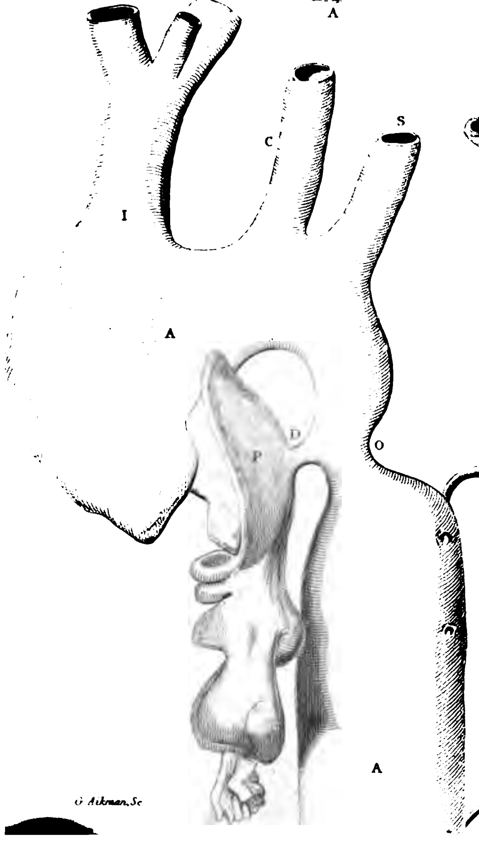


Fig. 4.

Fig. 5.



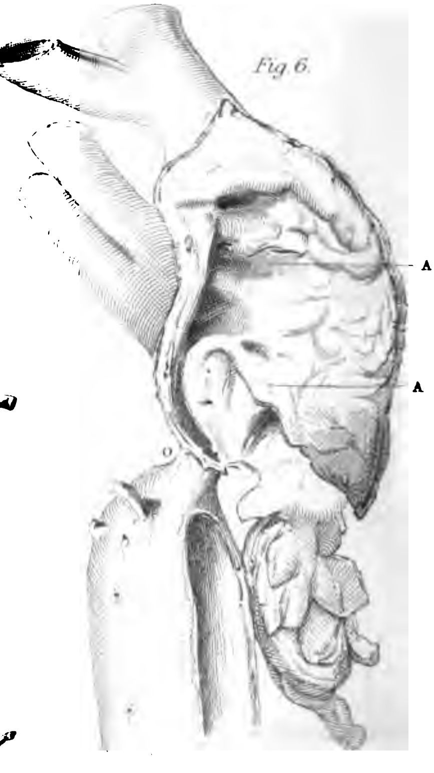


Fig. 6.

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The inner membrane of the aorta was thick, irregular, shrivelled, and opaque, and the valves were much firmer than natural.

The arch of the aorta was considerably enlarged and dilated; and its coats opposite to the origin of the innominata were thick, firm, and very hard. On slitting open the arch, it was found that the whole inner coat on the right side of the origin of the innominata consisted of a large patch of solid bone, not less in superficial extent, and rather more than a sixpenny piece; and the rest of the artery was thick, irregular, and wrinkled, but not ossified; the patch of bone was pretty thick, and rather irregular upon its surface.

Upon tracing the descending portion of the aorta, it was found to become suddenly much contracted; and about three-quarters of an inch below the origin of the left subclavian artery, it was altogether impervious, and its canal was obstructed. This obstruction did not occupy more than one-quarter or one-eighth of an inch; and immediately below the artery, it presented its usual area; but its coats were there flaccid, and not nearly so thick and firm as those at the arch.

The pulmonary artery was situate on the right side of the arch of the aorta, and adhered to the artery pretty firmly, nearly opposite to the point of obstruction, or slightly above it.

The contracted and impervious part of the aorta was indicated on the outside by a ligamentous structure, and a shrivelled or depressed appearance on the outer surface of the vessel.

The *ductus arteriosus* was distinct, but ligamentous and impervious, and it was attached to the aorta, a little above the point of obliteration.

All the glands in the surrounding cellular tissue were much enlarged.

This case presents a very good specimen of obstruction of the principal artery of the human body; and its occurrence suggests several important observations in a physiological and pathological point of view.

Though it seems at first sight difficult to account for the origin of this obstruction, yet a little reflection will show that its occurrence in this case must have arisen from a very slight deviation in the course of a natural process. The region of the obstruction corresponds exactly to that of the junction of the *ductus arteriosus* with the aorta, and the contracted point in the aorta, though a little lower down, was still slightly connected with the trunk of the pulmonary artery. These circumstances, taken along with the depressed and ligamentous appearance on the outside of the aorta, render it almost certain that this obliteration had taken place at the part at which the *ductus arteriosus* joins the aorta. It seems, therefore, that the obliterating action, which had taken place in the *ductus arteriosus*, had been from some peculiar cause prolonged into the aorta, and had there given rise first to contraction, and then to obliteration of the coats of that vessel.

The difficulty is to know in this case, what this peculiar cause was, or how it operated. We know that in the case of the *ductus arteriosus* obliteration of the interior of that vessel is the effect of the blood ceasing to flow through it, the blood being directed in another channel. But why this should have happened to the aorta it is not so easy to discover, unless we could see some other course by which the blood was to find its way through the abdominal aorta and the arteries of the lower extremities. Though from various circumstances, the course of the collateral circulation was not ascertained, yet it is scarcely possible to doubt that the blood must have been conveyed by the internal mammary and transverse cervical arteries, the lower intercostal and the lumbar arteries; for not a single drop of blood could have passed through the obstructed point, and yet the lower part of the body of this child was as well nourished apparently as the upper.

Another important circumstance deserving notice in this case, and which may perhaps throw some light upon the origin of the obstruction, was the state of the inner membrane of the left ventricle, the aortic valves and the aortic arch, down to the point of obstruction, as contrasted with the aorta below the obstruction. The white opaque appearance of the inner membrane of the ventricle, and the thick shrivelled appearance of the valves, showed that these parts had been the seat of inflammation, or the disease denominated *Endocarditis*, and the thick shrivelled, and warty appearance of the aorta with the bony deposit in its coats, showed that a similar morbid action had taken place in the interior of the aorta;

*(Arteritis.)* All the appearances there observed were the effects of inflammation, whatever be the remote cause which had induced this action. It is possible, therefore, that a mass of coagulable lymph had been thrown out, partly as the effect of inflammation, and partly to limit its extent along the artery, and that in this manner, while the current of blood was obstructed, the canal of the artery had become gradually contracted until it was obliterated. In confirmation of the truth of this view it must be observed, that the coats of the artery beyond the point of obstruction presented a very different appearance from that which they presented between the heart and the point of obstruction. While in the latter portion of the artery the inner membrane was rough, irregular, and partially ossified, and the whole coats thick, solid, and firm, approaching to the character of ligamentous structure, in the former situation the inner coat of the artery was perfectly smooth and healthy, and the coats themselves were thin and flaccid, almost similar to the coats of a vein.

It may be here added, that while it is extraordinary to observe at so early a period of life as the age of seven years, osteo-steatomatous thickening of the coats of the aorta, and while we cannot attribute this thickening, as in the case of adults, to the chronic inflammatory action induced by the use of mercury or that of ardent spirits, it is not difficult to understand, how this should be the result of inflammation, that is, *endocarditis* and *arteritis*, which may attack persons at any period of life. Since the time at which this case occurred, and since the foregoing remarks have been written, I have seen a remarkably distinct specimen of endocarditis of the whole of the left ventricle in an infant of 18 months. In this case the lining membrane of the ventricle was white and thick, and very firm, almost like thin cartilage, and the ventricle was in like manner hypertrophied and its cavity enlarged.

The enlargement and hypertrophy remarked in the left ventricle of the case above related may have been the effect either of the endocarditis, and the thickened and unserviceable state of the valves, with the rough surface of the interior of the aorta, or of the obliteration of that vessel, causing a permanent impediment to the issue of the blood out of the ventricle.

I. It may here be worth while to consider whether the foregoing remarks receive any confirmation from similar or analogous instances of obstruction to that now recorded.

Though instances of complete obliteration of the canal of the aorta are not numerous, yet several examples of different degrees of obstruction, or what is called constriction, and even of obliteration, have been recorded by different observers. In the treatise of Stentzel, *De Steatomatibus Aortæ*, that author records an instance in which the interior of the aorta had become occupied by

# Dr CRAIGIE'S MEMOIR ON OBLITERATION OF THE AORTA.

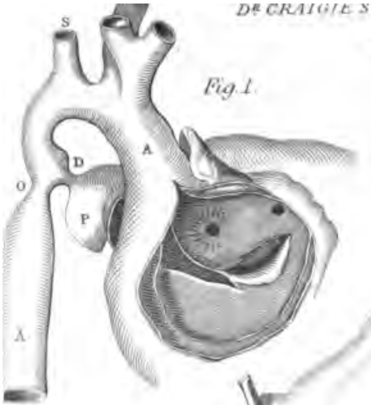
Fig. 1.

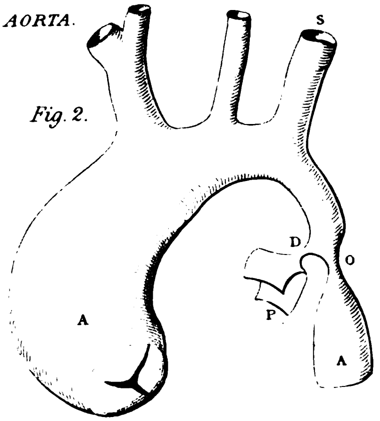
Fig. 2.

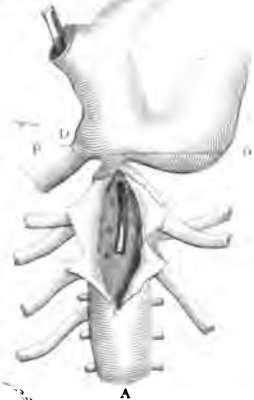
Fig. 3.

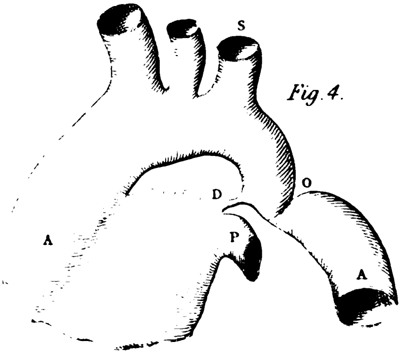
Fig. 4.

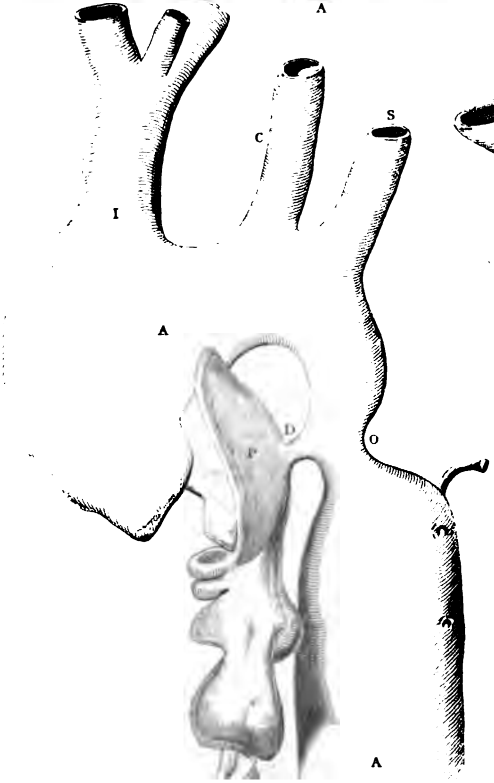
Fig. 5.

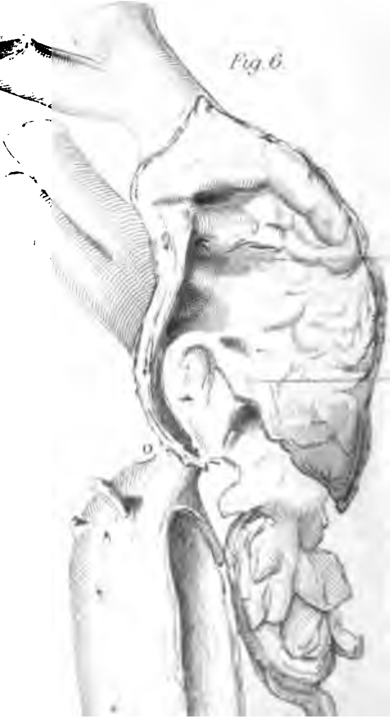
Fig. 6.

nal iliac of the right side joins the umbilical soon after this last leaves the lower border of the kidney. The external iliac of the right side mounts up on the posterior aspect of the abdominal muscles, and empties its contents into the umbilical vein a short distance from the umbilicus.

The umbilical cord then is made up of the canal of the urachus, one hypogastric artery, and the umbilical vein; this last, before joining the cord, occupying quite an extraordinary position, that of the right hypogastric artery.

The umbilical vein [U] has no connection with the liver. The venous branches which go to form the *vena portæ* in the natural state here empty themselves into the *vena cava* without passing through the liver. These two circumstances just mentioned show that the liver is here virtually a nonentity.

The state of the vascular system shows, too, that in the highest animals, the circulation can be for a time carried on without any heart at all.

The muscular structure is exceedingly imperfect, but some fibres of the *quadratus lumborum*, *latissimus dorsi*, and muscles of the spine can be detected, also some of the fibres of the abdominal muscles. The muscles of the extremities were not examined.

In the nervous system no irregularity can be observed. The spinal canal has the usual appearance, and is quite cartilaginous. The cord is covered by its theca, through which the nerves pass in perfect order.

The different joints and bones of the extremities present nothing abnormal, except what has been described.

The sternum and clavicles are present, and the ribs. These last are not attached to the spine, but to a white line on each side, diverging from the spine from above downwards. This white line has the appearance of such a tendon as we find in the course of the abdominal muscles.

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## ART. XII.—*Instance of Obliteration of the Aorta beyond the Arch, illustrated by similar cases and observations.* By DAVID CRAIGIE, M. D., &c. Physician to the Royal Infirmary.

SARAH LYON, a girl aged 7, was the daughter of a woman of the name of Janet Paterson, aged 34, who was admitted into one of the permanent fever wards of the Royal Infirmary on the 1st September 1840.

From the circumstance of the father being in one of the male wards labouring under fever, and the extreme destitution of the family, three girls and a boy were brought into the house in the course of a few weeks afterwards. The subject of the present notice was

admitted upon the 12th of October, in consequence of the appearance of various febrile symptoms the previous day. These symptoms consisted principally of rigors, pain in the head, back, and limbs, sore throat, cough, rapid and difficult respiration, and some pain in the left side of the chest.

At the time of admission, she complained of pain in the belly, especially in the epigastric and umbilical region; headach and pain in the back and limbs. The skin was hot and dry; there was considerable thirst; the soreness of the throat continued, and a faint eruption of minute spots was visible upon the chest; the bowels were constipated; the tongue was covered with a thin white fur; the pulse was 140; and the respiration between 30 and 40.

She was directed to get one colocynth pill; to take half-an-ounce of the saline ammoniated mixture every hour; and to have the hair removed.

Next day there was little change in the symptoms. The bowels had been freely moved; but the skin was hot and dry; the respiration continued rather quick and laborious, and the pulse was not reduced in frequency. Treatment was continued for three days more much in the same way, with the view of abating the febrile action, and diminishing the congestion in the lungs. The symptoms of the latter disorder, however, continued to increase, and on the 17th, the respiration was above 40, and the pulse was 140, sharp; and there was great heat of skin; constant motion of the chest and the *alae nasi;* and the beats of the heart were performed with a strong violent impulse, which shook the whole chest, and with a peculiar thrilling sound intermediate between the bellows sound and the smart blow of a hard body inside of the chest.

Five or six ounces of blood were directed to be drawn from the arm, according as the patient bore it.

Sunday, 18th October. The blood was drawn according to direction, without producing faintness; but no amendment of the symptoms took place, and the patient died this morning at two o'clock.

The body was inspected upon Tuesday, the 20th of October, and presented the following appearances.

The body weighed 2 stones, 10 lbs. and 2 oz. Two ounces of fluid were found within the cavity of the chest. The bronchial glands were much enlarged, firm, and fleshy. A considerable quantity of muco-purulent fluid was found within the bronchial tubes of the right lung, and when this was removed, the bronchial membrane was observed to be red, rough and villous. The right lung itself was considerably gorged with blood, slightly solidified, but not sinking in water as hepatized lung; it was free from tubercles. At one point, towards the inferior margin of the lower lobe of the right lung, a small part presented the dark-coloured hemor-

rhagic hepatization; the anterior part of the lung was emphysematous.

The bronchial tubes of the left lung were filled with muco-puriform fluid, and the bronchial membrane was reddened and villous.

The left lung was splenified, and of a bluish colour, but not sinking in water. At its lower part, there was a dark bloody-coloured spot, slightly indurated and friable. The anterior part of the lung was white and emphysematous.

The pericardium contained within it about two ounces of serous fluid.

The heart was very much enlarged in all its dimensions, and weighed ten ounces. The walls of the right ventricle were very much indurated, and did not collapse. The septum projected into the right ventricle, so as to form a convexity into its cavity. The walls of the left ventricle were firm, indurated, and ten lines thick in the middle part. The inner membrane was pale or whitish, thick, and firmer than natural, and irregularly warty.

The inner membrane of the aorta was thick, irregular, shrivelled, and opaque, and the valves were much firmer than natural.

The arch of the aorta was considerably enlarged and dilated; and its coats opposite to the origin of the innominata were thick, firm, and very hard. On slitting open the arch, it was found that the whole inner coat on the right side of the origin of the innominata consisted of a large patch of solid bone, not less in superficial extent, and rather more than a sixpenny piece; and the rest of the artery was thick, irregular, and wrinkled, but not ossified; the patch of bone was pretty thick, and rather irregular upon its surface.

Upon tracing the descending portion of the aorta, it was found to become suddenly much contracted; and about three-quarters of an inch below the origin of the left subclavian artery, it was altogether impervious, and its canal was obstructed. This obstruction did not occupy more than one-quarter or one-eighth of an inch; and immediately below the artery, it presented its usual area; but its coats were there flaccid, and not nearly so thick and firm as those at the arch.

The pulmonary artery was situate on the right side of the arch of the aorta, and adhered to the artery pretty firmly, nearly opposite to the point of obstruction, or slightly above it.

The contracted and impervious part of the aorta was indicated on the outside by a ligamentous structure, and a shrivelled or depressed appearance on the outer surface of the vessel.

The *ductus arteriosus* was distinct, but ligamentous and impervious, and it was attached to the aorta, a little above the point of obliteration.

All the glands in the surrounding cellular tissue were much enlarged.

This case presents a very good specimen of obstruction of the principal artery of the human body; and its occurrence suggests several important observations in a physiological and pathological point of view.

Though it seems at first sight difficult to account for the origin of this obstruction, yet a little reflection will show that its occurrence in this case must have arisen from a very slight deviation in the course of a natural process. The region of the obstruction corresponds exactly to that of the junction of the *ductus arteriosus* with the aorta, and the contracted point in the aorta, though a little lower down, was still slightly connected with the trunk of the pulmonary artery. These circumstances, taken along with the depressed and ligamentous appearance on the outside of the aorta, render it almost certain that this obliteration had taken place at the part at which the *ductus arteriosus* joins the aorta. It seems, therefore, that the obliterating action, which had taken place in the *ductus arteriosus*, had been from some peculiar cause prolonged into the aorta, and had there given rise first to contraction, and then to obliteration of the coats of that vessel.

The difficulty is to know in this case, what this peculiar cause was, or how it operated. We know that in the case of the *ductus arteriosus* obliteration of the interior of that vessel is the effect of the blood ceasing to flow through it, the blood being directed in another channel. But why this should have happened to the aorta it is not so easy to discover, unless we could see some other course by which the blood was to find its way through the abdominal aorta and the arteries of the lower extremities. Though from various circumstances, the course of the collateral circulation was not ascertained, yet it is scarcely possible to doubt that the blood must have been conveyed by the internal mammary and transverse cervical arteries, the lower intercostal and the lumbar arteries; for not a single drop of blood could have passed through the obstructed point, and yet the lower part of the body of this child was as well nourished apparently as the upper.

Another important circumstance deserving notice in this case, and which may perhaps throw some light upon the origin of the obstruction, was the state of the inner membrane of the left ventricle, the aortic valves and the aortic arch, down to the point of obstruction, as contrasted with the aorta below the obstruction. The white opaque appearance of the inner membrane of the ventricle, and the thick shrivelled appearance of the valves, showed that these parts had been the seat of inflammation, or the disease denominated *Endocarditis*, and the thick shrivelled, and warty appearance of the aorta with the bony deposit in its coats, showed that a similar morbid action had taken place in the interior of the aorta;

*(Arteritis.)* All the appearances there observed were the effects of inflammation, whatever be the remote cause which had induced this action. It is possible, therefore, that a mass of coagulable lymph had been thrown out, partly as the effect of inflammation, and partly to limit its extent along the artery, and that in this manner, while the current of blood was obstructed, the canal of the artery had become gradually contracted until it was obliterated. In confirmation of the truth of this view it must be observed, that the coats of the artery beyond the point of obstruction presented a very different appearance from that which they presented between the heart and the point of obstruction. While in the latter portion of the artery the inner membrane was rough, irregular, and partially ossified, and the whole coats thick, solid, and firm, approaching to the character of ligamentous structure, in the former situation the inner coat of the artery was perfectly smooth and healthy, and the coats themselves were thin and flaccid, almost similar to the coats of a vein.

It may be here added, that while it is extraordinary to observe at so early a period of life as the age of seven years, osteo-steatomatous thickening of the coats of the aorta, and while we cannot attribute this thickening, as in the case of adults, to the chronic inflammatory action induced by the use of mercury or that of ardent spirits, it is not difficult to understand, how this should be the result of inflammation, that is, *endocarditis* and *arteritis*, which may attack persons at any period of life. Since the time at which this case occurred, and since the foregoing remarks have been written, I have seen a remarkably distinct specimen of endocarditis of the whole of the left ventricle in an infant of 18 months. In this case the lining membrane of the ventricle was white and thick, and very firm, almost like thin cartilage, and the ventricle was in like manner hypertrophied and its cavity enlarged.

The enlargement and hypertrophy remarked in the left ventricle of the case above related may have been the effect either of the endocarditis, and the thickened and unserviceable state of the valves, with the rough surface of the interior of the aorta, or of the obliteration of that vessel, causing a permanent impediment to the issue of the blood out of the ventricle.

I. It may here be worth while to consider whether the foregoing remarks receive any confirmation from similar or analogous instances of obstruction to that now recorded.

Though instances of complete obliteration of the canal of the aorta are not numerous, yet several examples of different degrees of obstruction, or what is called constriction, and even of obliteration, have been recorded by different observers. In the treatise of Stentzel, *De Steatomatibus Aortæ*, that author records an instance in which the interior of the aorta had become occupied by two steatomatous depositions, which greatly contracted the dimensions of its canal.[*]

In his dissertation, also, on Diseases of the Heart, published in the History of the Royal Academy of Berlin, M. Meckel, the grandfather of the late Professor Meckel, records the case of an aged female who had died dropsical, and in whom the diameter of the aorta was not more than eight lines, which was at least one-third less than its natural diameter.[†]

Sandifort in like manner mentions the case of a man in whom he observed a similar change in the interior of the aorta, and in which this sort of deposition, or new growth, had evidently contracted very much the calibre of the artery.[‡]

It appears to me that cases of the kind now mentioned are not properly examples of the kind of obliteration of which the case recorded in this memoir is an instance. In this class of cases, the interior of the artery is the seat of a new deposition, which encroaches so much upon the canal of the artery, as sensibly to diminish its capacity. In the class of cases to which I would refer the one related in this paper, this state of the artery may take place; but, it is accompanied with an additional condition, which tends to render the constriction much more complete, and consequently to produce obliteration.

1. The first authentic case of the kind of obliteration to which I now refer, is that recorded by M. Paris, prosector of the amphitheatre at the Hotel Dieu in Paris, and published in the Journal de Chirurgie of M. Desault, in the year 1791.

In the winter of 1789, the body of a very emaciated female, about 50 years of age, was brought to the amphitheatre for inspection and demonstration. An injection, consisting of resin and tallow coloured with lamp-black, was thrown into the aorta, and penetrated so easily, that a great deal more than usual might have been introduced. In consequence of the leanness of the subject, the trunks and branches of the thoracic arteries were observed to be a great deal larger and more tortuous than usual, and this disposition of the vessels induced M. Paris to dissect the body with particular attention. He then recognized the following facts.

The part of the aorta beyond its arch, between the remains of the *ductus arteriosus* and the first inferior intercostal artery, was so contracted that its diameter was not more than that of a writing-quill, so that, in deducting the thickness of its parietes, which were not diminished at this point, only a very small cavity was left.

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[*] Christiani Godofr. Stentzel de Steatomatibus in principio Arteriæ Aortæ, repertis, &c. Wittembergæ, 1723. Haller, Dissertationes Medico-Practicae, T. ii.

[†] Observations sur les Maladies du Cœur par M. Meckel, Histoire de l'Academie Royale des Sciences et Belles Lettres, 1756, Tome xi. and xii. Berlin, 1758, p. 51.

[‡] Ed. Sandifort Anatomes et Chirurgiæ in Acad. Bat. quæ Leidæ est Professoris, Observationes Anatomico-Pathologicæ, Lugd. Bat. 1777, Lib. iv. cap. x.

The part of this artery above the contraction was scarcely dilated, and that below it retained its ordinary capacity. The most careful dissection did not enable M. Paris to discover either in the aorta, or in the adjacent parts, any cause to which so extraordinary a state could be ascribed.

The carotid arteries and the branches proceeding from them presented nothing peculiar; but the innominata, or first branch of the arch, as also the right subclavian, presented one-third more than their natural diameter. The left subclavian was one-half larger than it usually is. The branches issuing from the two subclavian arteries had enlarged in the same proportion, and described very extensive and numerous tortuosities. The internal mammary arteries were two lines in diameter; and the superior diaphragmatic was one line and a-half in diameter and very tortuous in its course. The transverse cervical arteries were double their natural size; and all their posterior branches pursued a lengthened serpentine course, before communicating with the posterior branches of the intercostal arteries. The intercostal arteries issuing from the subclavian were two lines in diameter. The thoracic arteries, the common scapular artery, and the other principal arteries issuing from the axillary arteries, to be ramified wholly or partially upon the chest, were twice larger than in the ordinary state.

The intercostal arteries, springing from the thoracic aorta below the contraction, were larger in proportion to their proximity to it. The first and second were each three lines in diameter, and the following arteries decreased insensibly to the last, which were almost in the natural state. The anterior branches of those arteries were little enlarged; but the posterior branches were so increased, and formed tortuosities so numerous and so close, that they resembled the beads of a rosary. Their communications with the transverse cervical arteries were considerable and manifest.

The branches issuing from the abdominal aorta presented nothing remarkable excepting the lower diaphragmatic artery, which was larger than natural, and communicated freely with the upper diaphragmatic,—and the epigastric artery, which was of the same size as the internal mammary, with which it formed numerous anastomotic communications.

From the peculiar disposition now mentioned, M. Paris regarded it as manifest, that the circulation was performed in this woman in a peculiar manner. Instead of following the direction of the trunk of the aorta, the blood passed from the branches rising above the contraction, that is to say, from those furnished by the subclavian and the axillary arteries into the branches rising below this contraction, as the intercostals, the lower diaphragmatics, and the epigastrics, by means of the numerous communications observed between these arteries round the chest and the anterior part of the abdomen.*

2. The next case of this description is that which is recorded in the fifth volume of the Medico-Chirurgical Transactions, by Dr Graham, the present Professor of Botany and Medicine in the University of Edinburgh, and President of the Royal College of Physicians. This occurred in a young man, named Henry Frere, aged 14, admitted into the Infirmary of Glasgow, on the 3d August 1813, for symptoms believed to indicate the presence of pneumonia. Under the use of the ordinary remedies, he recovered and left the hospital as well on the 6th of October. He was readmitted, however, on the 13th of November 1813 with dyspnœa, palpitation, and pain in left side of the chest, and much throbbing of the carotid and temporal arteries. Various remedies were again used; but the breathlessness and palpitation increased, and he expired on the 2d of January 1814.

Upon inspecting the body the following appearances were found.

The pericardium contained one ounce of fluid, and the heart was enlarged to twice the natural size; the walls of the left ventricle being very much thickened. The aorta, near its origin, expanded unusually, so as to form a kind of pouch; but, after giving off branches to the head and superior extremities, its diameter was preternaturally contracted. It was continued of this diminished size till after its union with the *canalis arteriosus*, where it was completely impervious. The coats were not thickened or in any way diseased, except that about half-an-inch below the stricture there was on the inner surface a smooth elevation less raised, but having nearly the diameter of a split-pea; otherwise, the appearance was exactly such as if a ligature had been tied tightly round the artery. The obstruction was about one line in breadth. The artery then received three trunks about the size of crow-quills, and nearer them three smaller ones, afterwards resuming its natural size along the vertebrae. These three trunks are evidently the uppermost of the inferior intercostals. Their coats were remarkably thin, like those of veins.

A probe passed from the pulmonary artery along the *canalis arteriosus*, to the obstructed portion of the aorta, but from its thickened appearance, it did not seem probable that much communication by means of it could have been allowed.

The *arteria innominata*, the left subclavian, the superior intercostals, and the mammary arteries, were much enlarged. The epigastric was reported of its natural size.

From these facts, and from the aorta presenting very nearly its natural size, immediately below the stricture, Dr Graham inferred that the blood did not pass to the inferior extremities in any material quantity, by the inosculations of the mammary and epigastric arteries, but chiefly by the communications of the superior intercostals and the mammary arteries with the three large branches entering the aorta below the stricture, and from the mammary and thoracic arteries through others of the intercostal and diaphragmatic arteries.*

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* Rétrecissement considerable de l'aorte pectorale, observé à l'Hotel Dieu de Paris, chez Journal de Chirurgie, par M. Desault. Tome ii. page 107. Paris, 1791.

An account of this case in the French language is also given in the thirty-second volume of the Journal de Medecine of Corvisart, Leroux, and Boyer, by Mr Henry Rainy, the gentleman who conducted the dissection. It is sometimes referred to as a separate and distinct case; but it is manifestly the same as that recorded by Dr Graham. Vide Journal de Medecine, Tome xxxii. 1815, p. 377.

3. The third case of this series was observed by Mr Winstone of Charter House Square, and occurred in a gentleman aged 57, of full habit, accustomed to free living, but who had enjoyed good health for years, excepting winter cough, which always at that season became very violent. In the night of April the 7th 1809, he was attacked with cough and difficulty of breathing to a greater degree than usual. He had pain under the sternum; the extremities were cold, and the countenance bore marks of extreme anxiety. The pulse was weak, but regular and much altered in frequency. Various remedies were employed. He walked up stairs, and fell lifeless on the bed.

The pericardium was distended with blood, which had escaped from rupture of the right ventricle of the heart, extending through its substance and lacerating the coronary vein on the anterior surface of the ventricle. "The finger being thrust into the aorta opposite to that part at which the *canalis arteriosus* terminates, a stricture in it was discovered, which with difficulty admitted the little finger, and upon a particular examination was found to be a thickening of the circular fibrous structure of the vessel, accompanied with some ossification of its coats."†

4. The fourth case in this series is recorded by Dr Adolphus William Otto, in his New Rare Observations, and is to the following effect.

A handsome and well-nourished girl of 17 years, was regarded as healthy, though she had occasional attacks of crying and anxiety in the chest, but which speedily gave way under the vigour and gaiety of youth. One night in the month of January, she went with bare feet to take care of a relation who had been unwell, and after she had felt violent pains in the chest, was immediately taken ill with anxiety and inconsciousness, pain under the breast-bone, failing pulse, &c. Next morning she felt herself apparently better; but shortly after she died suddenly.

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* Case of Obstructed Aorta. By Robert Graham, M. D. Medico-Chirurgical Transactions, Vol. v. page 287. London, 1814.

† Surgical Essays. By Astley Cooper, F. R. S., and Benjamin Travers, F. R. S. Part i. p. 115, 3d edit. London, 1818.

On inspecting the body, the head presented nothing abnormal. In the cavity of the chest the lungs were sound; but the pericardium was distended with effused blood. Upon attentive examination the following remarkable circumstances were observed.

The aorta, which in its arch was quite normal, and about one Paris inch in diameter, underwent a progressive narrowing or contraction to the spot where the *ductus arteriosus Botalli*, here completely closed and ligamentous, opens into the artery, so that at this place the canal could scarcely admit a writing-quill; but became enlarged immediately below to its usual diameter.

The tightening of the aorta at this place appeared to be almost a malformation, or at least to have taken place in early infancy; as the aorta at this place was in other respects not diseased; neither thickening of the arterial tunic nor cicatrization, nor ossification could be observed at this point; and the tunics of the aorta did not here differ from those in the rest of its course. It is nevertheless to be observed, that in the neighbourhood of the contracted spot externally, on the aorta, there appeared a small hardened something calcareous knotty part, under which, however, the membranes of the vessel appeared quite normal.

This pathological process, which Dr Otto designates as unimportant, he regarded not as the cause of the aortic contraction, but the consequence rather of the irritation arising from the impediment to the current of the blood; and to this he also is disposed to ascribe the circumstance, that the aorta appeared no longer to retain its natural elasticity, and showed under the internal membrane several of the small white specks which precede ossification. As the blood during life was propelled only with difficulty through the contracted part, and hence in the beginning of the aorta would very often be obstructed, so the beginning of the aorta near the heart was very considerably enlarged in all its directions, without, however, being aneurismatic.

At this part also the cause of death was found. The aorta was burst near its beginning. A recent serrated laceration was found in the left wall of the aorta, close upon the semilunar valves, extending about one inch in length straight upwards, about one-fourth behind the orifice of the left coronary artery, and bent then something outwards. Through this laceration the blood had escaped into the cavity of the pericardium, and coagulating firmly there had compressed the artery, and to some extent prevented the further effusion of blood from the artery.

This Dr Otto supposed to explain the reason why the life of this young woman had been prolonged about eight hours after the rupture of the aorta.

In the aorta there were instead of three only two semilunar valves lying parallel, from before backwards.

The heart was normal in size and shape, except that the left ventricle was a little too fleshy.

The pulmonary artery presented nothing abnormal, and, as usual, was provided with three semilunar valves.

On the anterior surface of the heart there was a small plastic concretion, the remains of some previous partial inflammation.*

5. A fifth case which I would refer to this series occurred to Alexander Meckel of Bern, and is recorded in the Archives of John Frederick Meckel for 1827.

On the 18th of January 1827, during the prevalence of a violent cold and bitter north wind, a countryman, named Samuel Bürki, 35 years old, belonging to Hornbach on Thun, previously healthy, robust, and well-made, was attacked, in carrying a heavy load from the corn-market of Bern, with sudden weakness, so that, unable to proceed further, he was brought to the hospital. The feeble condition disappeared after some hours, but was followed by giddiness. Then ensued pain at the stomach, with some oppression in the chest, complete anorexia, frequent bilious and mucous vomiting, without remarkable irregularity in the pulse, chiefly without manifest symptoms.

On the sixth day the disease appeared entirely gone; the patient felt himself better; rose towards mid-day; ate, according to previous habit, with good appetite; composed himself afterwards comfortably at the stove, and fell down lifeless.

The deceased was without relatives, and his body was surrendered for dissection. When the chest was opened in order to inject the arteries, there appeared at once the pericardium filled to distension with black blood; and rupture of the right auricle, which at the same time appeared somewhat thickened and softened, as the cause of death from compression of the heart. The intended injection of the heart, on account of considerable dilatation of the ascending aorta, had to be postponed. The prosector, Dr Hermann, tied then the left carotid artery and the left subclavian, to prevent regurgitation of the injection, and fixed the tube in the trunk of the innominata. When a quantity of injection quite sufficient for this vessel was melted and injected, this injection encountered not the slightest resistance; an irregular escape of the injected matter was apprehended to have taken place; the injection was considered as a failure; the body was laid on the side, and another was injected with good success for the purpose of demonstration.

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* Neue Seltene Beobachtungen, zur Anatomie, Physiologie und Pathologie gehorig. von Dr Adolph Wilhelm Otto, Koniglichem Medicinalrathe im Medicinal Collegium fur Schlesien, ordentlichem Lehrer der Medicin an der Universitat und Chirurgischen Lehranstalt u. s. w. Berlin, 1824. 4to. Dritter Abschnitt c. xxix. Eine Zerreissung der Aorta wegen stellenweiser grosser Verengerung derselben. Seite 66.

Meanwhile, upon opening the abdomen, the vessels were found filled, and the lower extremities were injected even to the foot; further, Dr Hermann followed the trace of it, and he found the aorta immediately below the ligamentous *ductus arteriosus* obliterated to the diameter of a small straw; there appeared, at the same time, a singular *rete mirabile* of arteries between the branches of the arch and the posterior branches of the descending thoracic aorta.

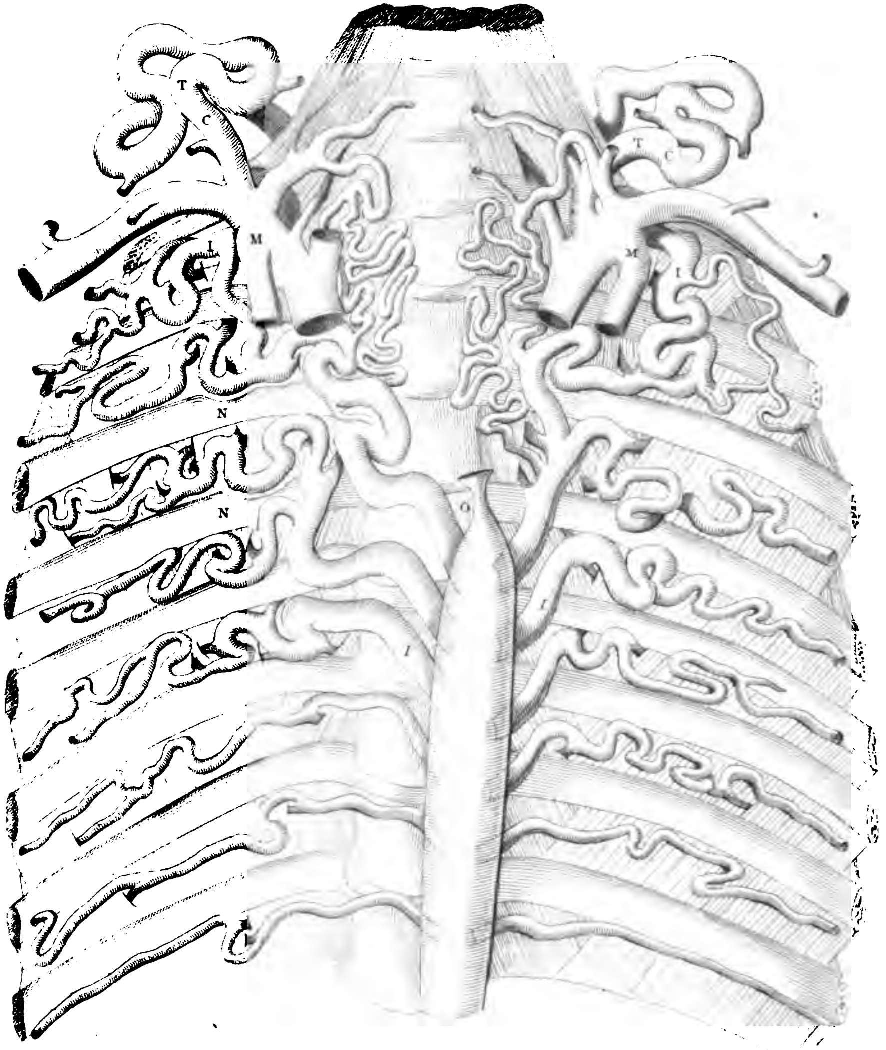
It may be proper to observe here, that the deceased Burki had been previously in service as a miller, and laboured as a robust peasant, lived according to the diet of the peasants, and had been often exposed to violent corporeal efforts and bad weather. He had for several days lived almost without food, and had undergone considerable evacuations; his vascular system must have been in a relaxed state, and, nevertheless, he expired upon the first slight error in diet, after a meal, perhaps a little too copious, which might have occasioned some commotion in the blood. The rupture of the heart was also produced by a slight excitement of the vascular system.

Upon examining the collateral circulation, the following appearances were recognized. All the anastomoses between the internal mammary arteries and the anterior branches of the intercostal arteries were greatly enlarged, and formed numerous serpentine convolutions. The superior intercostal arteries in like manner issuing from the subclavian arteries were very much enlarged, their diameter being fully a quarter of an inch; and they formed several serpentine convolutions in their course. The transverse cervical arteries were much enlarged, the left being as large as the subclavian itself almost, .and the right not much less; and both very tortuous in their course.

All the intercostal arteries proceeding from the aorta below the point of obliteration were very large in size, and pursued a most tortuous course. The first, which rose from the aorta opposite to the fifth dorsal vertebra, were about the third of an inch in diameter. The left, after sending off two considerable branches, divided into two very large vessels more than one-fourth of an inch in diameter, the superior of which performed the duty of two intercostal arteries, and the lower that of intercostal artery, between the third and fourth ribs. The upper branches, also formed numerous serpentine inosculations with the descending branches of the transverse cervical arteries. The first intercostal artery (aortic) on the right side, after sending off branches communicating by tortuous convolutions with the inferior thyroid arteries, also divided into two branches, following a very serpentine course along the spaces between the first and second, and second and third ribs.

The anastomotic communications between the transverse cervi-

VIEW OF THE COLLATERAL CIRCULATION, IN THE CASE OF SAMUEL BURKI.



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cal arteries and the posterior perforating branches of the interosstals, which, in their natural state, are small and scarcely perceptible, had here become large vessels, and, like all the others, formed in their course multiplied serpentine windings. The other intercostal arteries were also much enlarged, though less so than the superior vessels. Below, about the eighth and ninth dorsal vertebræ, they were much of their ordinary size.

Another circumstance not undeserving of notice was, that in the margin of various ribs where the enlarged vessels passed or were lodged, they had formed deep furrows or notches, which had a carious aspect; but which were evidently the effect of attrition or wearing only. This was particularly marked in the third, fourth, and fifth ribs of the right side.*

This is one of the most remarkable cases recorded, particularly in regard to the clearness and the amplitude of the details. M. A. Meckel is the first who has described fully and accurately the remarkable changes in the collateral circulation, and he has represented most distinctly the great enlargement and the tortuous course of the vessels maintaining the collateral circulation.

The case, nevertheless, though published in the year 1827, has escaped the notice of all those who have hitherto written on the subject; and, so far as I am aware, this is the first time in which it has been made known in England.

6. The sixth case referable to this head is recorded by M. Reynaud in the 1st volume of the Journal Hebdomadaire de Medecine.

A man, aged 92, a cordwainer, entered the Hopital de la Charité on the 19th June 1827. He was of small stature, much emaciated, with a small bald head, and retreating forehead. In consequence of the feeble state of his understanding, it was impossible to obtain satisfactory information on his previous condition. He stated, nevertheless, that the mouth had been drawn to one side, and the right arm had been paralytic. At that time he used both arms equally well; but it was observed that the right hand was slightly inflected, and carried in abduction. The head was constantly hot; the temporal arteries beat strongly; the pulse was hard, frequent, and regular; the skin was hot and dry, the tongue parched and shrivelled; but he was not thereby prevented from making continual demands for food. The bowels were constipated, and afterwards loose. Nothing peculiar was observed in the organs of respiration, except that percussion below the right collar-bone produced a duller sound than in the corresponding point on the left side. From lying constantly on the back, a gangrenous eschar was formed over the sacrum. After a pretty long abode in the hospital, he expired without presenting any other remarkable symptom.

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* Verschliessung der aorta am vierten Brustwirbel. Von A. Meckel zu Bern. Archiv fur Anatomie und Physiologie, herausgègeben von Johann Friedrich Meckel, Jahrgang, 1827. Leipzig, seite 345.

The body, inspected twenty-four hours after death, disclosed the following appearances.

A small quantity of turbid serum was found in the cavity of the arachnoid membrane and the tissue of the *pia mater*. The two cerebral hemispheres, and particularly that of the left side, presented numerous traces of old apoplectic effusions, not extensive, some situate towards the circumference, others at a greater depth. The largest was situate in the centre of the left *corpus striatum*. The change observed in several points of the surface of the brain presented the following characters. The gray matter had disappeared over a space more or less extensive, yet the arachnoid membrane was in the corresponding points unaffected. Beneath it was a sort of superficial erosion, at the bottom of which was seen filamentous cellular tissue of an ochre-yellow colour and infiltrated with a small quantity of milky-like serum. Of the little cavities found in the interior, some were filled with yellowish cellular tissue infiltrated with serum of the same colour; others were lined by a smooth transparent membrane containing clear serum. The rest of the brain presented nothing remarkable.

The heart was of its ordinary volume. The internal membrane of the left ventricle was a little thickened, slightly opaque, and of a milk-white colour. In the sigmoid valves were some points incrusted with osteo-calcareous matter.

The aorta at its origin was of its usual volume. It speedily gave off the brachio-cephalic trunk, (*innominata*), the calibre of which was much larger than in the natural state. After furnishing this branch, the aorta was considerably diminished, and ascended obliquely upwards, and to the left in the direction of the left carotid, which it gave off; then bending at an angle almost acute, it descended, presenting a slight swelling, to the point where the ligamentous residue of the *ductus arteriosus* is joined to it. Near this point it gave off the left subclavian artery, which, much dilated at its origin, proceeded almost directly upwards, diminishing its volume sensibly before furnishing any other branch. The aorta immediately after underwent a very considerable circular contraction, such as might be produced by means of a ligature drawn with some tightness; then recovering its volume, it presented a slight enlargement, the curvature of which was more perceptible on the left than on the right side. The aorta was then continued into the abdominal cavity, where its calibre seemed smaller than in the normal state. This difference was particularly sensible towards its inferior part, and the external iliacs did not appear to be proportioned to the volume of the lower extremities.

From the termination of the right subclavian, which was remarkable for its size, issued several arteries of large dimensions. The transverse cervical and the deep cervical, both equal almost in bulk to the humeral artery, pursued their usual course, and were remarkable for the thickness of their parietes, and the great number of their windings. The first of these arteries, after having arrived, without diminishing its volume, near the angle of the fourth and fifth ribs, entered their interval, gave off the anterior intercostal branches, and the corresponding posterior ones, crept a little beneath the pleura, and, being continued with an intercostal arterial trunk, joined the aorta half-an inch below the contracted point. The deep cervical artery presented this peculiarity, that, pursuing a shorter course, and descending more directly along the posterior and superior part of the back, it divided into three large branches, which entering the chest separately, between the intervals of the four first ribs, and sending off the corresponding intercostal arteries, arrived at the aorta, in which they terminated by the same number of large openings. A similar disposition was observed on the left side. The transverse cervical and the deep cervical arteries, not quite so large, but pursuing the same course, also entered the chest, and terminated in the left side of the aorta below the point of contraction. On this side also was observed the superior intercostal artery, which, springing from the subclavian, was joined with the trunk of the second aortic intercostal artery.

The right and left internal mammary arteries were remarkable for their great size, exceeding in calibre the humeral artery. Both, after pursuing the usual course, diminishing a little towards the lower part of the chest, increased sensibly in calibre, became very tortuous; then continuing with the epigastric artery and forming with it one single trunk, the size of which exceeded that of the external iliacs, entered the crural artery, which was also much enlarged. Before giving off the *profunda*, the crural artery furnished a large branch, which M. Reynaud traced into the *obturator externus*. The right epigastric artery was not quite so large as the left.

The coats of the aorta presented no change in texture, except in some isolated points, where they were slightly thickened. Near the contracted point they appeared also to be in a state of complete integrity. Viewed internally, the contraction had a very regular circular shape. Its diameter was that of a crow-quill.

The following statements show the dimensions of the aorta at different points, and of the principal trunk issuing from that vessel.

| | |
|---|---|
| Aorta one inch from its origin, . . | 10½ lines. |
| The brachio-cephalic trunk (*innominata*,) . . | 6½ |
| The aorta between the innominata and the left carotid, | 5 |
| The aorta after the origin of the left carotid, . . | 5½ |

| | |
|---|---|
| The left subclavian at its origin, . . | 6½ lines. |
| The aorta at the point of contraction, . . | 1½ |
| The aorta below the point of contraction, . . . | 7 |
| The aorta below the coeliac trunk, . . . | 5⅞ |
| The aorta before its division into the iliacs, . . . | 4½ |
| The external iliac, . . . . . . | 2½ |
| The crural artery below the origin of the epigastric, . | 3½ |
| The internal mammary at its origin, . . | 2½ |
| The mammary 5 inches from its origin, . . . | 1⅜ |
| The left epigastric, . . . . . . | $1\frac{1}{12}$ |
| The right epigastric, . . . . . . | 2 |
| The deep cervical, . . . . . . | $1\frac{7}{12}$ |
| The first intercostal, which was joined by one of the branches of the deep cervical, . . . . . . | 1¼ |

In this case, though the aortic canal was not totally impervious, yet the channels by which the collateral circulation was established, were numerous and ample. As in the case recorded by A. Meckel, a complete anastomosing circle of vessels was established by the transverse cervical with the intercostal arteries, and by the internal mammary with the epigastric arteries, all of which were greatly enlarged, and more or less tortuous and convoluted in their course.*

7. The seventh case, which may be referred to the present head, is recorded by M. Le Grand, in a tract published at Paris in 1832.

M. Le Grand gives first the report of the inspection, and then a history of the patient's symptoms during life.

On the 2d October 1832, died M. Maechel, at the age of 48½ years, a member of the *Protestant Society of Provision and Mutual Assistance*, a sort of insurance establishment, to which M. Le Grand is one of the physicians. The body was inspected next day, twenty-four hours after death, by M. Amussat, surgeon to the society, M. Dujardin-Beaumetz, and M. Le Grand; and the following facts were ascertained.

The body was rigid, the belly well developed, and bore marks of an old and recent puncture; the thighs and legs were œdematous. On the region of the heart was a seton.

Nothing important was found in the cavity of the abdomen. Upon opening the peritonæum, there escaped two or three pints of serous fluid, similar to that furnished by the previous tappings. The mucous membrane of the stomach and the whole intestinal canal presented the normal consistence. The spleen was of the usual size, but pretty firm. The liver was of the usual size, but its substance was granular and yellowish; and it adhered to the intestines by several slips of false membrane. These two organs were almost entirely covered with large pearly cartilaginous patches, which in several points were nearly one-third of a line thick. The parietes of the thoracic duct were thickened and yellowish.

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* Observation d'une Obliteration presque complete de l'Aorta suivie de quelques reflexions, et precedée de l'indication des faits analogues consignées dans les auteurs. par M. Reynaud. Journal Hebdomadaire de Medecine, Tome premier, 1828, p. 161. Paris, 1828.

The heart, surrounded by the pericardium, occupied more than one-half of the thoracic cavity. The two lungs, and especially the right, long compressed, were scarcely half the normal size; and the *pleurae* adhered to the costal *pleurae* by numerous points. The lungs, though obstructed, were quite permeable to air.

The pericardium contained about one pint of fluid similar to that found in the abdominal cavity. The heart was as large as that of a large calf; and its surface was covered with opaque pearly cartilaginous patches. The walls of the right auricle were thicker and firmer than natural; the left auricle presented nothing uncommon. The chamber of the right ventricle appeared little dilated; but its walls were perceptibly thickened. The left ventricle was enlarged in capacity, and formed almost one-half of the organ. Its walls were also thickened.

Immediately above the origin of the left subclavian artery, where the aorta after forming the arch becomes descending, there was observed a slight contraction, and then a distinct enlargement, which diminished rapidly over the whole circumference of the artery, forming, eight lines below, a contraction much more considerable than the first, and embracing the artery regularly, as if it had been inclosed in a circular knot. After this contraction, the artery was rapidly enlarged, resuming not the whole volume, which it previously had, but a uniform diameter and capacity.

On slitting the descending aorta to the lower contraction, there was observed a small circular septum inserted by a broad base on the prominence forming the contraction in the interior of the artery, which presents on its inner wall a very marked depression. A circular opening of above one line and a-half in diameter, situate exactly in the centre of this septum, allowed the blood to pass. The membrane forming it was of a texture quite similar to that of the artery, and was attenuated towards its internal margin, where it became so thin as to be semitransparent.

It was further observed, as to the structure of this membrane and its mode of insertion, that, in proportion as in becoming thick, it increased the contraction of the walls of the aorta, it forced them to form large folds, which were unfolded when the blood filled the artery; and which were prolonged as they were relaxed, as far as the first contraction, which was noticed as situate immediately below the origin of the left subclavian artery.

The same folds, though less numerously, were found below the second contraction.

The symptoms under which this man laboured may be understood from the following abstract of the lengthened statement of M. Le Grand.

On the 8th September, when M. Le Grand was first called to Maechel, he found the patient labouring under inflammatory and plethoric symptoms to such a degree, that he thought it requisite to perform blood-letting and to repeat it next day. Marked relief followed, though only of short duration; and on the 8th October the patient was as bad as ever. M. Kapeler was then requested to see him in consultation.

At this time violent beating of the carotid arteries was manifest; the sound of the heart and its impulse were heard forcibly before and behind over the whole chest; and the contractions of the ventricle were accompanied with a well-marked bellows sound, which was heard towards the region of the heart and along the whole course of the aorta. These symptoms were thought to indicate the presence of active aneurism of the heart, complicated, perhaps, with pericarditis.

The remedies recommended were a seton over the region of the heart, small blood-lettings often repeated, frequent local bleeding by leeches to the seat, and the use of pills of aloes and soap, with restricted diet.

Under these means the symptoms were abated, and the health of the patient was improved. But deterioration having again taken place, another consultation with M. Kapeler was called on the 10th May 1831.

At this consultation it was stated that the carotids continued to beat most forcibly; the bellows murmur was heard somewhat less intensely over the region of the heart, while it was as distinct as possible over the course of the innominata and the subclavian and carotid arteries; and violent throbbings were perceptible in the course of one of the superficial arteries which winds along the inferior margin of the scapula, and which comes from the left subclavian artery.

These symptoms led M. Le Grand to infer that there was an impediment to the circulation either in the aorta or in the innominata; and that, undoubtedly, there was aneurism of the heart with hypertrophy. The treatment recommended was chiefly that of Valsalva, excepting that, with regard to the blood-lettings, there was some reserve. The symptoms proceeded; the breathing became very laborious and difficult, almost suffocating; dropsical effusion began, and soon became general; and, notwithstanding all the usual diuretic, and alterative and deobstruent remedies, as well as milk diet, with anodynes, death took place at noon on the 2d October 1832, after twenty-five months of the disease.*

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* Du Retrecissement de l'Aorte; du Diagnostic et du traitement de cette Maladie, &c. par le Docteur A. Le Grand. Paris, 1832. 8vo, pp. 58.

In this case there are some peculiar circumstances which show, that it is not perhaps quite similar to the other cases referred to this head. 1. It was a case not of obliteration, but of contraction only; for a passage to the blood was still left in the centre of the membranous transverse septum. 2. The obstruction or contraction was effected, not so much by the centripetal contraction of the walls of the artery, as in all the other cases, as by the formation of a new structure attached to the inner surface of the walls of the artery. This membranous diaphragm was in all probability a new product from the interior surface or membrane of the artery; but, whether it had been of old standing, or formed about two years or more previous to the fatal termination of the illness of the patient, we have no means of determining. 3. The contracted part was of greater longitudinal extent in this than in the other cases. In all the others it was generally only one single line, or about the tenth or twelfth part of one inch. This circumstance is so remarkable that it cannot fail to attract notice; and in the case of the young man, Henry Frere, recorded by Dr Graham and Mr Rainy, the latter observed that it was surprising to observe this complete obliteration occupy only one or two lines of extent, and then the artery, become all at once permeable, receive (give off) three or four considerable branches, recover its ordinary dimensions, and continue its wonted course in the chest and abdomen. In the case now detailed, though the point of greatest contraction and obstruction was not more than one line, yet the space of the arterial canal contracted was fully three-fourths of an inch. The lower part of the arch immediately below the origin of the left subclavian was suddenly contracted to about one-third, its calibre being not greater than that of the subclavian itself, which in this case was unusually small. From this point it gradually tapered until, about six or seven lines lower down, it was still more completely contracted by the transverse septum already-mentioned. Below this again, it expanded to its usual capacity.

The situation of this contraction is nevertheless nearly the same as in the other cases, that is, below the junction of the ligamentous *ductus arteriosus*. This, indeed, is not mentioned by M. Le Grand; but the figure which accompanies his description shows that it was the case.

For my knowledge of the two cases now detailed, (6th and 7th), as well as Case 4th, I am indebted to my intelligent friend, Dr William Thomson.

8. An eighth case, which I would refer to the present head, is recorded in the North of England Medical and Surgical Journal, by Mr Joseph Jordan, of Manchester. It occurred in the body of a man brought for dissection to the medical school in that city; and the only information that could be obtained of him pre-

vious to death was to the following effect. He was twenty-one years of age, a butcher by trade, and could lift heavy baskets of meat apparently as well as other men. He was considered to be weak in intellect, had an impediment in speech, and was occasionally subject to fits; his habits were dissolute, he was fond of liquor, and had been drinking with his associates a short time before his death, which took place suddenly, by dropping down lifeless in the street.

The appearances found on examining the vascular system were the following:—

" The pericardium was found greatly distended, and, on being slit open, it proved to be by blood, partly fluid, partly coagulated, effused into its cavity. When removed it was supposed to equal about half a pound in weight. The first circumstance which struck us, was the aorta increased to twice its usual size, its surface tense, shining, and of a bluish colour, through its whole course from the heart to its exit out of the pericardium. No orifice could be found for a long time by which the blood had escaped into the pericardium,—at length a small one was found at the right and posterior side. This was so small as only to allow a common probe to enter, it had the appearance of a small fissure or crack, there was no apparent ulceration, or inflammation near it. An incision was now made along the fore part of the aorta, from the heart to its exit out of the pericardium. This, instead of laying open the aorta, exposed a cavity containing a quantity of firm coagulated blood, of a brownish red colour, adhering rather firmly to the parietes. On detaching and removing this, the aorta was seen to pass through the centre of the cavity, and of its usual size, (see plate 2 and 3), but on more accurate inspection, this proved to be the aorta deprived of its pericardial covering, consisting merely of an internal and fibrous coat. About the middle of its course an aperture was observed, which would have admitted a horse-bean. It seems probable that this was the primary mischief, that the blood had pased through this crack, and insinuated itself between the fibrous tunic and the external or pericardial covering, which in a natural state adheres very closely to it—but by this means had become separated, and dissected from it by the blood, and distended to such a degree, that it had at length given way itself, by the small opening at the posterior and right side, allowing the blood to escape into the pericardium."

" The aorta appeared very much contracted, if not obliterated, immediately below the point to which the *ductus arteriosus* is fixed, and the very great size of the three arteries which arise from its arch, seemed to corroborate this opinion, (see plate 3); but what chiefly struck our attention was, that although the aorta was filled with injection, there was considerable movement allowed, as if there was a division between the wax at this part. To examine the state of this part internally, an incision was commenced about three lines below the constriction, and carried an inch and a-half downwards; the descending aorta was then turned upwards, as is seen in plate 2, and we found that the aorta was completely obliterated, about three lines below the union of the *ductus arteriosus.* There was a little dimple or depression in the centre of the obliterated part: the wax had formed an exact impression of it (plate 2), being of a conical form, the apex a little rounded off. An incision was now made into the aorta, above the obliteration; here also we observed a similar *cul de sac*, in the centre of which was a little dimple corresponding to the one on the other side, and at this point the partition was so thin that the light readily passed through. The remnant of the opening of the *ductus arteriosus* was two lines distant from the central depression. There was in fact a remarkable similarity in the appearance of these two depressions,—viz. of the obliterated point, and of the obliterated *ductus arteriosus.* The wax formed a more rounded bulging extremity than in the one below. There was not the smallest particle of lymph or coagulum in the cavity of the aorta, either above or below the obliteration. The coats of the aorta were of their usual thickness, there was no lymph on the exterior of the aorta, nor was there any disease or effect of inflammation discernible about its obliterated part or in the neighbourhood.

"Our next object of inquiry was, in what manner the circulation was carried on under these circumstances.

"The origin and course of the aorta were as usual, but a remarkable peculiarity of form had taken place in its arch; there were dilatations at the origin of each of the three great arteries which arise from its convexity, and decided contractions between those dilatations. It was evident the blood, being obstructed at the point aforesaid, had been thrown into those three vessels,—viz. *arteria innominata*, the left carotid and left subclavian, which were greatly increased in diameter, particularly the subclavian, which, on comparison, exceeded the common iliacs. The carotids were not so remarkably enlarged.

"The first set of vessels which the subclavian gives off were enormously increased in size, but particularly the *arteria intercostalis* superior and the internal mammary. The *intercostalis superior* on each side equalled the femoral artery in size, took its usual destination, but had become remarkably tortuous and convoluted, dividing itself into several branches, some of which passed out of the chest behind the ribs, and descended amongst the muscles of the back to inosculate with the posterior branches of the intercostal arteries of the descending aorta. But the largest branches passed in front of the ribs, and terminated, by remarkable anastomoses, with the first and second intercostal arteries of the aorta, but particularly with the first. The ribs had become deeply absorbed and sulcated in some parts, by the pressure of the branches of this artery.

"The internal mammary on each side was very little inferior to the bronchial in size. They took the usual course, and terminated in five or six branches, which were continued directly into the 5th, 6th, 7th, and 8th, intercostal arteries of the aorta; these latter arteries were greatly enlarged, and had become remarkably tortuous, and in some places convoluted on themselves (see plate). There was no remarkable anastomosis between this artery and the epigastric, which was of its usual size through its whole course. It is to be regretted that, the diaphragm having been removed, the size of the phrenic arteries could not be ascertained.

"The next enlarged collateral channel was the *infra-scapular* of the axillary artery, or a branch arising immediately below it. This was larger than the ulnar artery, ran down the side of the chest, under the *latissimus dorsi*, in a very tortuous manner, and terminated in the 7th and 8th intercostal arteries of the aorta.

"It was evident, therefore, that the chief collateral channels, by which the blood had passed from the aorta, above the obliteration, to that vessel below it, were three,—viz. the *intercostalis superior* and *internal mammary* of the *subclavian*, and the *infra-scapular* of the axillary arteries on each side. The blood was transmitted by these to the eight superior intercostal arteries of the *aorta descendens*:—but chiefly into the three superior from the intercostal branch of subclavian,—and the three inferior of the eighth from the internal mammary, and *infra-scapular*. The two intervening intercostals, however, were of considerable size.

"There did not seem to have been any want of circulation in the abdominal viscera, or lower extremities, which were apparently sound, and well nourished; as a proof of which, the limbs had been used in the lectures, for the purpose of demonstrating the muscles, and it was a frequent observation, how large and strong they were."

I shall afterwards show that, regarding the nature of this case, and the propriety of referring it to the present head, some doubt may be entertained. I place it here, nevertheless, in the meantime, to obviate all cavil, reserving the consideration of its proper position to a subsequent part of this paper.*

The ninth case, which I think can be referred to this head, is recorded by Mr Robert L. Nixon, Surgeon in Dublin, in the fifth volume of the Dublin Medical Journal.

Dr B., an English medical gentleman, aged 27, placed himself under the care of Mr Nixon, in July 1833, for the relief of very severe dyspeptic symptoms, as loss of appetite, thirst, foul tongue, disinclination for exercise, pain in the right hypochondrium, with tenderness and fulness in the corresponding region of the liver. Under the use of purgatives, antimonials, and the compound calomel pill with regulated diet, he became much better. But in the course of one month he applied again to Mr Nixon for the relief of symptoms, which he regarded as those of hepatitis. At this time Mr Nixon found the liver enlarged, hard, and painful to the touch. About a fortnight after this, Mr Nixon perceived a small tumour below the margin of the false ribs, which communicated to the finger slight pulsation, which increased daily till it became evident to the eye. The tumour also enlarged, was accurately circumscribed, and presented both to feeling and auscultation, the purring thrill of aneurismal varix. The carotids and right subclavian artery also throbbed disagreeably, and the aorta presented a strong bellows sound throughout its whole course. The patient was also distressed with dysphagia.

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* A Case of obliteration of the Aorta, by Joseph Jordan, Esq. Surgeon to the Lock Hospital, Manchester. The North of England Medical and Surgical Journal, Vol. i. London, 1830–31, p. 101.

In the latter part of November, the patient, in consequence of exposure to cold, was attacked with symptoms of bronchitis, with much breathlessness. Leeches were applied over the windpipe immediately above the sternum ; the bleeding was allowed to proceed for about forty hours before Mr Nixon was summoned. But though the strength of the patient was much reduced by this discharge, the throbbing of the vessels in the neck had nearly ceased, the tumour in the abdomen was reduced in size, and its pulsation was weakened. After the use of animal food, wine, and quinine, for some days the tumour continued still to diminish in size, and to become firm, and about one month after, it had entirely disappeared. On the 1st of January 1834 he had another urgent attack of breathlessness, with pain under the right scapula, and down the side. These were treated by low diet, and turpentine embrocations, and he again made a slight recovery. Afterwards, however, he became dropsical, the sputa became tinged with blood, and after much suffering, death took place on the 12th of April 1834.

The appearances disclosed by dissection were the following:

The skin was tense, shining, peculiarly white, and pitting on pressure ; the muscular system was much wasted, and the adipose structure had almost entirely disappeared.

The liver was much enlarged, pressing down between the margins of the ribs and sternum ; it was also very hard, and exhibited on its outer surface several large yellow tubercles ; no trace of tumour was found in or about it.

The heart was large and fleshy, presenting hypertrophy of the left ventricle with dilatation. The right ventricle was smaller than natural, and the septum large and thickened, and projecting into it. The right auricle was large, the left normal. The auriculo-ventricular openings on both sides were enlarged. The aorta at its origin was healthy in structure and natural in size. A small abscess about the size of a pea, was found in the muscular substance of the heart, near the point where it is joined by the aorta.

The innominata was considerably and the left subclavian slightly increased in capacity; and the left carotid was normal.

The aorta in its transverse portion at the point where it is joined by the *ductus arteriosus*, exhibited a constriction similar to what would occur, if a sharp body had been pressed upon its upper surface, until it had diminished the calibre by one-half. No deposition of osseous or calcareous matter was observed upon it, and the *ductus arteriosus* was pervious.

The aorta in the remainder of its course appeared a little narrowed in its calibre but normal in structure, excepting a few atheromatous spots in its lining membrane. The aortic valves were completely obliterated, or rather represented by an irregular fleshy mass, which grew from the line of junction of the vessel with the heart, and almost totally filled the canal. In this mass were deposited a few particles of calcareous matter, one of which was very hard and white, about the size of a small bean. The communication between the heart and aorta was reduced to an irregular slit-like opening, through which a common probe could not pass without difficulty.

10. The case recorded in the beginning of this memoir makes the tenth of this class.

The cases now mentioned form, if not the whole, at least the most authentic of those on record. One is mentioned by Mr Nixon as being recorded in the 33d volume, 1815, of the Journal de Medecine of Corvisart and Leroux. Two mistakes are here committed. The case referred to is recorded not in the 33d, but in the 32d volume of that Journal; and the case, as already noticed, is that of the lad Henry Frere, already mentioned as recorded by Dr Graham in the 5th volume of the Medico-Chirurgical Transactions. The case was communicated by Mr Henry Rainy, now Dr Rainy of Glasgow, the gentleman who conducted the dissection, when at Paris in 1815, to the Medical Society of Emulation, and was translated into French, and published in the 32d volume of the Journal de Medecine as one of that Society's communications.

It is curious to observe that both Reynaud and Le Grand have fallen into the same mistake. The first, after detailing the case as given by Dr Graham in the Medico-Chirurgical Transactions, as taking place in an *enfant de quatorze ans*, afterwards relates the same case from the account of Mr Rainy, as taking place in a young man, *de quatorze ans*. Le Grand, to make his distinction more plausible, gives first the case of Henry Frere as a patient in the *Grand Hopital de Londres*, and then the history of a young man who died in the *Hopital de Glasgow*.

It may be observed, that the whole of the cases now mentioned, as well as that which I have above recorded, agree in the following circumstances. *First*, the obliteration takes place in a definite point in the artery, namely, at, or immediately below, that part where the *ductus arteriosus*, converted into a ligament, joins the descending part of the arch of the aorta ; *secondly*, the constriction or obliteration is formed by some change in the arterial tunics themselves, and is not caused by the pressure of any tumour external to them, or taking place in the arterial tunics; and *thirdly*, the obliteration is confined to one single point, rarely longer than one line, excepting the case, No. 7, by M. Le Grand.

II. There is, however, another class of cases which have been by all those who have hitherto treated this subject, confounded with those already enumerated, but which, in sound pathology and in common sense, ought to have been distinguished entirely from them. In this second class of cases the canal of the artery may be merely much contracted, or it may be altogether obliterated; but the contraction or obliteration, whatever it be, does not take place always at the same exact point at which it does in the class of cases already surveyed. It may take place at any point of the aorta; most usually it takes place in the abdominal aorta, much farther down than in the case of the instances already recorded. Another circumstance of much moment as a distinctive character in this second class of cases, is, that though it may be connected with an important change in the tunics of the artery, yet it is also the result of causes which I would call extrinsic, that is, not originally seated in the arterial tunics; and even when the contraction is connected with a change in the tunics of the artery, still this change operates very much as an extrinsic cause. A third circumstance, also important as a distinctive character, is that the contraction or obliteration is usually more extensive than in the first mentioned class of cases, and may occupy half an inch, one inch, or two inches of the arterial tube.

To render this distinction more clear, I must mention, that in this second class of cases, the contraction and obliteration of the aorta is caused either by the pressure of a tumour external to the artery, or by the pressure of an aneurism formed on the arterial tunics, and which, from some peculiar circumstances, presses a portion of the arterial tube so much as to diminish it greatly, and finally to effect its obliteration. This distinction, I am confident, needs only to be explained in order to be admitted by all judicious pathologists; and I am satisfied that no one who considers attentively the facts of the two classes of cases will doubt the propriety of adopting the distinction which I have now established. It is by overlooking this distinction that we find, with a confusion of ideas only to be met in medical writings, all sorts of cases of contraction, constriction, or obliteration confounded together, merely because they agree in the general circumstance of obstruction to the current of blood through the interior of the artery. Regard for precision requires a different method of procedure.

It is probable that different degrees of constriction or diminution of the calibre of the aorta, from the causes to which I have now adverted, are not uncommon.

1. One of the earliest noticed cases is recorded by the Neapolitan physician, Marcus Aurelius Severinus, to whom it was communicated by Nicolaus Larcheüs, an eminent Roman surgeon, who met it in dissecting the body of a female aged 33, in December 1635. This woman, who, according to the account, was much addicted to the use of wine in excess, and devoted generally to the pleasures of the table, was attacked with symptoms of intense fever, in the midst of which she presented violent pulsation in the region of the stomach. Larcheus, who was called to her, inferred the existence of an internal aneurism. The symptoms proceeded, and, notwithstanding the use of appropriate remedies, terminated fatally in the course of a few days.

Upon dissecting the body, in tracing the aorta from below upwards, at the renal arteries above the bifurcation of the aorta into the iliac arteries, he found three masses of coagulated fibrin pressing on each other, which so completely plugged up the canal of the aorta as to render it quite impervious even to air.*

In this case there is strong reason to believe that the pressure of the aneurismal tumour of the cœliac artery upon the canal of the aorta had at first retarded, and at length interrupted the current of blood downwards, and thus, by favouring the formation of clots, had obstructed, and then closed the canal of the aorta. Though Larcheus denominates these bodies concrete phlegm, *(ex pituita concreta)*, it is impossible to doubt that they were the fibrin or clot of the blood decolorized.

2. A second case quite similar is recorded by John Fantoni, as having occurred in the practice of his father. In dissecting the body of a person who had laboured under frequent fainting fits, with wandering pains in the belly, and latterly fever without distinct accessions, and who had expired in a fit of fainting, Giambattista Fantoni found, besides a large quantity of blood extravasated between the folds of the mesentery and round the kidneys, an aneurism of the abdominal aorta a little above the iliac arteries,

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* M. Aurelii Severini de Recondita Natura Abscessuum, Edit. Francofurti, 1643. Lib. iv. Appendix. Historia mirabilis Aneurismatis interni, p. 280.

and immediately in the site of the aneurismal tumour, very thick polypous masses, which impeded the course of the blood towards the iliac arteries.* These polypous masses were manifestly the fibrin of the blood.

I have already referred to one case mentioned by Stentzel; and two, I may say three, are recorded by the elder Meckel in the Memoirs of the Berlin Academy, (Obs. xvi., Obs. xvii., Obs. xviii.), in which the artery was constricted or diminished in capacity in different degrees and from different causes. Others are found recorded in different works. Without attempting to enumerate all, I shall mention the most important.

3. Störck mentions that, in inspecting the body of a female, aged 64, who had long laboured under difficult breathing and palpitation of the heart on making any exertion, and who died in syncope, he found the arch of the aorta completely bony and the tunics thickened, but the canal of the artery so small that it would not admit the little finger.†

One is said to be recorded by Bras d'Or in the Recueil Periodique. But as I find no copy of this work in any of the libraries of this city, I merely mention it without particular details.

Several cases, however, are recorded which have been thought to be examples of the kind of obstruction mentioned under the first head, but which manifestly belong to the second; and of these the most important are the following:

4. Dr Goodisson of Wicklow, while in Paris in 1818, communicated to Dr Philip Crampton the following case, which is recorded in the second volume of the Dublin Hospital Reports.

In the body of a female which had been brought from the Hotel Dieu to the Hôspice de la Pitié, Dr Goodisson, in attempting to trace the origin of the inferior mesenteric artery, discovered a hard tumour, which was placed directly in the line of the aorta. He then found this to consist in a diseased state of the vessel, which was impervious or obliterated from the origin of the inferior mesenteric artery downwards, its whole length,—with the greater part of the iliacs on each side, the canal of the left being closed to its bifurcation into external and internal, and that of the right to more than half the length of the common iliac.

The artery lay close, and was firmly attached to the spine. It had precisely the appearance of the trachea; being flattened on its posterior surface, but preserving anteriorly its cylindrical or convex form.

The iliac veins were so closely connected with the arteries as to cause considerable difficulty in their removal.

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* Joannis Baptistæ Fantoni, Observationes Anatomico-Medicæ editæ et Scholiis illustratæ a Joanne Fantoni filio. Turin, 1699. Venet. 1713. etiam apud Boneti Sepulchretum, iii. p. 556.

† Annus Medicus II. Cadaver decimum tertium. Vindobonæ, 1762, p. 262.

That part of the aorta and *vena cava*, with the portions of the iliac arteries and veins included in the disease, were surrounded by a large quantity of gelatino-cartilaginous matter.

After removing the heart, aorta, and diseased parts from the body, the following facts were ascertained.

The sesamoid bodies of the aortic semilunar valves were much enlarged and reddened. The mitral and tricuspid valves were occupied by vegetating granulations and excrescences.

The aorta at the arch was considerably dilated, being nearly double the natural size. Its inner surface was occupied by patches of bony matter, chiefly at the origin of the vessels going to the upper extremities. Similar osseous deposits were scattered downwards along the course of that artery.

At the obliterated part, the sheath of bone was very thick and strong, so as to cause some difficulty in opening the artery. The external appearance of the artery led Dr Goodisson to believe at first that its canal was enlarged; but this was not the case at the time of examination. The bony sheath encased the artery for the space of about two inches, and was filled with a firm fleshy substance, which had the appearance of the muscular fibre of the heart. This substance was prolonged upwards beyond the bony sheath, and adhered firmly to the coat of the artery.

Dr Goodisson regarded the internal coat as the medium of this osseous deposition.

The intercostal arteries, especially that which runs along the last true rib, were much increased in size, and formed considerable anastomoses with the mammary arteries, which were also much enlarged, and the continuations and branches of which were remarkably convoluted or tortuous.

The spermatic arteries were greatly increased in size, and their course was much convoluted and very serpentine. The *circumflexa ilii* of the left side was so much enlarged as nearly to equal the external iliac artery itself. The *circumflexa ilii* of the right side was of the ordinary size. Both were spiral in their course.

The inferior mesenteric artery at its origin was completely closed. Part which remained pervious presented a conical shape, the apex of the cone upwards.

The canal of the left iliac was altogether obliterated down to its bifurcation into internal and external.

The right iliac continued pervious about half an inch above the bifurcation; but beyond this no appearance of any passage having existed was observed.

Dr Crampton, to whom this case was communicated, justly regards it as an instance of aneurism of the abdominal aorta which had undergone the spontaneous cure. "The fleshy substance, indeed, which had the appearance of the muscular fibres of the heart, and which filled the aorta for the space of two inches," accords in appearance, characters, and situation, with the condensed fibrin which lines the walls of old or long-continued aneurisms, and which appears to be deposited from the blood in the effort made by the parts to prevent total rupture of the artery, and the consequent fatal escape of blood.

This conclusion Dr Crampton verified by cutting open longitudinally the diseased portion of the artery, and turning out the condensed coagulum by which it was filled. He then found the following appearances.

The internal coat, covered with steatomatous and earthy concretions, completely lined the cavity of the dilated portion of the artery. The dilated portion itself consisted of three irregular pouches, which proceeded from the anterior and lateral surface of the vessel. Dr Crampton, therefore, infers that the disease commenced with dilatation of the artery, in consequence of a previously diseased and weakened state of its coats; and yet that there had been neither ulceration nor rupture of the arterial tunics.

Dr Crampton very properly regards the obliteration in the aorta as the result of a totally different process from that by which the same effect was produced in the cases recorded by M. Paris and Dr Graham. It was indeed produced by the pressure of the coagula of the aneurismal tumour itself, and is an instance of that species of obliteration which I have classified under the present head, and to which Mr Hodgson refers in his treatise on Aneurism at p. 250 and 251, Part ii. Section iv.

It is not unseasonable to remark that Dr Crampton is the first, and I believe the only author who has accurately distinguished the two kinds of obliteration, and who has understood thoroughly the mechanism of this second species of obliteration.

4. A case very similar to this is recorded by Dr Monro, Professor of Anatomy in the University of Edinburgh, in the third volume of the Edinburgh Journal of Medical Science.

In this case, which took place in the person of a man of middle-age, who died from tubercular disease of the lungs, upon examining the body, the following appearances were recognized.

On the second and third lumbar vertebræ was lying a distinctly circumscribed tumour, which, on minute investigation, proved to be connected with the abdominal aorta. This tumour was about the bulk of a middle-sized orange, was considerably flattened; and it adhered firmly to the second and third lumbar vertebræ, the bodies of which were denuded and carious. When the tumour was pressed, it felt hard, and was evidently filled with clotted blood.

Upon dividing the sac, it was found to be thicker than the coat of any sound artery; but did not seem to be composed of layers, nor presented any deposition of bone. It resembled thick white leather which had been steeped some time in water.

The aneurismal tumour was filled with portions of coagulable lymph, which were not disposed in parallel layers of equal thickness, as in most aneurisms, but in short unconnected portions crossing each other in different directions, so as to form a confused irregular mass, which, being pressed between the fingers, was evidently mixed with gritty matter like sand.

The abdominal aorta entered into the very middle of the sac.

The portion of the artery immediately above the aneurismal tumour was contracted, and in that place the coats of the artery were to the touch firmer than usual, and whiter. Above this contracted portion was a conical-shaped plug, firm in consistence, with the smaller extremity undermost. This plug was of a deep-red colour, and seemed to be composed of a solid mass of coagulable lymph mixed with red globules. It was about one inch and one-eighth long, and about one inch broad at its base, and was fixed by thin laminæ of coagulable lymph to the inner surface of the aorta.

This mass of coagulable lymph filled and completely obstructed the passage of blood through the aorta; the portion of the vessel between the lower part, or the apex of this conical-shaped plug, and the aneurismal sac was impervious, and did not admit the smallest probe.

The inner surface of the sac did not present any appearance of a rupture of the inner coats of the aorta.

The cœliac, superior mesenteric, renal, inferior mesenteric, and lumbar arteries were not larger than usual.*

All the cases now mentioned under the second head afford examples of obliteration of the canal of the aorta in consequence of the pressure of aneurismal coagula upon the arterial trunk, or the presence of coagula within the canal of the artery in the course of the spontaneous cure of this disease. There is still another mode in which the canal of the aorta may be more or less compressed, and may thereby become obliterated. Thus, either in consequence of incurvation of the spine, the canal of the aorta may be compressed and obliterated, as happened in one of the cases of M. Meckel; or a tumour may arise externally in the vicinity of the aorta, and by its gradual enlargement, or the pathological changes which it undergoes, may encroach so much upon the aorta, as to diminish materially, or even to obliterate entirely its canal.

One of the most remarkable examples of the latter sort of obliteration is recorded by M. Velpeau. A woman, aged 36 years, had in the arm a cancerous tumour, which was removed by operation. From this she recovered and remained for a considerable time well. She was then attacked with phlegmonoid erysipelas in one of the legs, and by this disease was speedily destroyed. The body when inspected disclosed a very extensive collection of cancerous tumours internally.

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* Observations on Aneurism of the Abdominal Aorta, accompanied by the obliteration of that Artery. By Alexander Monro, M. D. Professor of Anatomy in the University of Edinburgh. Edinburgh Journal of Medical Science, Vol. iii. p. 74. Edinburgh, 1827.

Thus the lungs were occupied by numerous tumours, varying in size, and presenting all the characters of the scirrhous texture. Similar tumours were found between the pleura and the ribs, and some in the bronchial glands.

The stomach, the duodenum, the liver, and the pancreas all presented more or fewer of these tumours, and those between the mesentery had effected obliteration of the aorta.*

It is perhaps not relevant to the other points of this case to remark that the tumours now mentioned were not properly instances of the texture called *scirrho-carcinoma*, which is very rarely found so extensively diffused, as was the case in the body of this woman, and is not often found at so early an age as 36 years. It is more natural to believe that these tumours were examples of encephaloma, or what used to be called *fungus hæmatodes*, which is always found in the anatomical position occupied by the tumours now mentioned. But it is important to observe, that in this case the encroachment upon the capacity of the aorta was produced by the gradual increase in the size of the tumours.

I think it clearly results, from a general view of the whole of these cases, that the distinction between the first and the second class is perfectly well founded. The more, indeed, we study the history and characters of both classes, the more clearly requisite does the distinction appear.

In the first class of cases every one must be struck with the uniformity with which the contraction or obliteration takes place in all these cases at the same point of the artery. It is always a little below the junction of the *ductus arteriosus* with the aorta; and it is clear that this, with the small extent of the contraction, cannot depend on any accidental circumstance. It seems, in short, to be the effect of some principle, regular even in the mischief which it accomplishes, and in the mode in which it effects its purpose.

The question of the mode of formation is intimately connected with that of the lesion being recent or of long duration, newly produced or congenital, or at least effected soon after birth. If we look to the perfect state of the collateral circulation, the apparent health enjoyed by the subjects of the lesion, and the long time life was continued, we must be inclined to believe that the lesion was of very long duration, probably coeval with the existence of the patients. This point, however, will appear more clearly from some reflections which I have subsequently to offer.

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* Exposition d'un cas remarkable de Maladie Cancereuse avec Obliteration de l'Aorta, &c. par M. A. Velpeau. Paris, 1825, 8vo. Extrait dans la Revue Medicale, Tome xix. et iii. 1825.

There is one point, however, in which both to a certain extent agree. In so great an obstruction to the transit of the blood through the aorta, the question comes to be, how is the circulation carried on, and by what vessels is the suspended function of the aorta performed? This question has occupied the attention of almost all the authors who have met with cases of this kind of obstruction, viz. M. Paris, Dr Graham, Dr Goodisson, and M. A. Meckel, and Mr Jordan. The question may be said to have been most accurately determined by M. A. Meckel; for most of the previous observers, excepting M. Paris, have rather indulged in conjectures than given positive proof. The views of M. Meckel have been corroborated by the observations of Mr Jordan.

M. A. Meckel, by the aid of the injection of M. Hermann, has shown very clearly that the lower intercostals particularly were the vessels by which the lower part of the chest and the lower extremities must have been supplied with blood. It is very likely also, from the observations of Dr Goodisson, that the epigastric arteries and the circumflex arteries of the ilium aided powerfully in conveying the blood into the vessels of the lower extremities. But the most important conclusion is, that the aorta, though at first sight essential to the maintenance of the circulation of the lower extremities, may, nevertheless, have its function so completely suspended, that even when it is obliterated, the lower part of the trunk and extremities are fully supplied with blood.

Of all the authors who have directed their attention to this subject, no one has ascribed the fatal termination to the obstruction of the aorta alone. Thus, in the case recorded by M. Paris, the individual had attained the age of 50 years, and no mention is made of the state of the circulation, which must have continued a long time, being concerned in the cause of death. In the case recorded by my friend, Dr Graham, the individual had attained the age of 14 years, and, by the healthy and vigorous appearance which he presented, previous to the attack which carried him off, there was no reason to believe that he was the subject of a lesion of the great artery of the body so considerable. Dr Graham also seems to have thought, that, had it not been the exposure to cold, and the consequent induction of pneumonic and bronchitic symptoms, this young man might have attained a considerable age. He infers, in short, that this lesion of the aorta was perfectly compatible with the continuance of life.

In the case which occurred to Mr Winstone, the individual had attained the age of 57 years without any indication of suffering from disorder or impediment in the circulating function, and without worse or more urgent symptoms than take place in nine-tenths of the human race, who live as this gentleman did, and who are advancing to the verge of three-score years.

In this respect, the remarkable case recorded by M. Reynaud exceeds all that have yet been recorded. If we can believe the statement as given by the man himself to Reynaud, he had advanced twenty years beyond the ordinary term of human existence, when he was overtaken by mortal illness.

These facts, with those of the other cases already recorded, show that, within certain conditions, there is in this lesion nothing incompatible with a prolonged career of existence, nothing, in short, necessarily by itself tending to shorten life; and that persons with such a lesion may be vigorous, healthy, and have a robust appearance.

Perfectly similar are the views of M. A. Meckel on the influence of this lesion on life and health. He had ascertained that the person who was the subject of his case had led a laborious life, as the servant of a miller, and that he was often exposed to vicissitudes and severities of weather. It is true that M. A. Meckel thought there was reason to conjecture that Samuel Bürki had at some early period of life undergone the painful disorder of which the residue was seen after death; that he had recovered, and had forgotten his previous illness in his subsequent robust health. This may have been the case; for there is no positive evidence to disprove such a view. At the same time it must be observed, that it seems more probable, when we consider this case along with the others of the same kind, to infer, that the closure of the aorta had taken place soon after birth; that the circulation as re-established was perfectly adequate to continue life, and maintain a great degree of strength; and that death took place, as the author thought in this instance, from the rupture of the right side of the heart.

There are, nevertheless, several circumstances which show that in persons with this sort of lesion, life is held by a precarious tenure. It will be observed, that, among the ten cases which I have recorded, in not fewer than four, viz. cases 3d, 4th, 5th, and 8th, the immediate cause of the termination of life was laceration of the heart or aorta;—an event in a great degree attributable to the impediment encountered by the blood in passing out of the left ventricle into the arch of the aorta. It must also be remembered, that, in several of the cases, considerable dilatation had taken place at the origins of the first branches of the aorta,—a change which must be regarded as the effect of obstruction to the issue of the blood from the left ventricle, and a proof of the constant excessive congestion and distension which the presence of so great and complete an impediment cannot fail to cause. It is clear to demonstration, that, with such an impediment, any circumstance which might either retard issue or augment distension, might at once and suddenly cause such lacerations as are recorded to have taken place in the cases now referred to.

It must be further observed, that, among the ten cases, the usual effects of exposure to cold and catarrhal or other disorder of the lungs, gave rise to greatly more violent and formidable symptoms than take place in ordinary circumstances in persons with the usual conformation of the arterial system. Thus in the case of the young man, H. Frere; in that of Mr Winstone's patient; in that of the girl recorded by Otto in case 5th, and in cases 9th and 10th, the symptoms of disorder in the organs of respiration were much more violent, and less amenable to treatment than we have reason to believe they would have been in persons without this impediment to the circulation. This is in perfect accordance with what is observed in many, if not all cases of disease or malformation of the heart or arteries, in which there is a considerable impediment to the movement of the blood out of the ventricle. Though persons labouring under such disorder are reasonably comfortable, and seem to enjoy a considerable amount of health when quiet, and not suffering under catarrh or the other effects of exposure to cold, yet no sooner are they exposed in any way, or get wetted or chilled, than they are attacked with the most violent symptoms of breathlessness, the most urgent and distressing oppression and anxiety, often with a feeling as if of instant death by suffocation. Quite the same kind of symptoms were evinced by the child which came under my own care, and I may add, by several other persons who have been ascertained to be labouring under a permanent impediment to the course of the blood from the heart.

Several of the observations now made are manifestly founded on the idea, that the impediment of which I have been speaking in the first class of cases, is either of very long duration or congenital. Without contending exactly for the latter view, which is probably incapable of proof, if we consider the state of the fœtal circulation, I think every thing connected with the history of this lesion shows that it must have commenced at a very early period of life, perhaps very soon after birth. Already in speaking of the case of the child Sarah Lyon, I have expressed the opinion that the site of the lesion renders it probable that the contraction or obliteration of the aorta may have depended upon the same cause which obliterates the *ductus arteriosus*. This process of obliteration commences, so far as I have been able to ascertain, in the bodies of infants examined soon after birth, in the aortic end of the duct; and it seems not unnatural to infer, that, were the closure from any cause to be attended with much contraction, or to be a little extended, it would produce partial, if not total constriction of the aorta. Reynaud has remarked, that in almost all adults the aorta shows a certain degree of constriction at the very place, at which the ligamentous arterial duct is joined to it.

An idea, not undeserving attention, has been announced on this subject by M. Reynaud, who, observing that a similar anatomical arrangement is found in the batrachoid amphibia, or frog family, during the whole period of existence, infers, though not very confidently, that it may be applied to explain the arrangement of the vascular system now under consideration, by referring it to the earliest periods of intra-uterine life in the Mammalia. This idea, though not perfectly correct, nevertheless suggests the class of facts amidst which we are probably to look for the explanation of a structure apparently so anomalous. There seems to be no doubt, that, for the explanation of almost all facts of structure of the nature now mentioned, we can only search with a reasonable hope of success in the history of the early development of the ovum of man and the animals below him, in the scale of organized beings. I am only not quite sure, that we can find the whole of this explanation in the structure of the amphibia, either with temporary or permanent branchiæ. There is further, among the fishes, an arrangement of vessels which certainly does make an approach, in one respect, to the arrangement which is the subject of consideration in this paper.

In these animals, the aorta cannot be said so correctly to give off branches as to be formed from branches. Thus, in the cartilaginous fishes, each gill sends off an artery; and these uniting on each side form three vessels, which are eventually conjoined into one trunk, which is, correctly speaking, the aorta. In the osseous fishes, in the same manner, four vessels, issuing from the gills on each side, are united so as to form one single trunk, which is then lodged in the canal formed in the bodies of the vertebræ.

Though the arteries of the gills correspond with the divisions of the pulmonary artery of man and the Mammalia, yet they seem, in many respects, to correspond better with the intercostal arteries. If we consider the superior intercostals as uniting to form the subclavian and carotid arteries, and the inferior ones as uniting to form the descending aorta, we perceive, if not a full explanation, at least such an analogical resemblance, such a similitude in type of formation, as may at least enable us to understand, how this deviation in the disposition of the vascular system is formed. To consider all the characters of this analogy, however, would lead me too far into the uncertain regions of transcendental anatomy; and I must conclude with two remarks.

All these views derive, I think, strong corroboration from the case recorded by myself in this paper. This case is useful, in the first place, in showing that the obliteration does, or at least may take place, at a very early period of life. To me, indeed, it appears that the lesion is the result rather of an arrest of development than of a positive and active disease. A particular part of the artery below the *ductus arteriosus*, from some peculiar cause, ceases to enlarge as the rest of the artery above and below that point does;—or, it may be, that the obliterating contraction which begins in the aortic end of the *ductus arteriosus*, extends a little into the aorta, and inordinately constricts the side and tunics of that vessel. The blood does not move easily along, but stops; the enlargement of the vessel, or rather its growth, proceeds at the same rate with that of the other parts of the body, while at the point of constriction it is stationary.

Meanwhile, the blood is finding a new channel for itself through the superior and inferior intercostals, the transverse cervicals, the mammary, the epigastric, and the circumflex arteries of the ilium, which it is much more easy to do at this early period of life, when all the textures are pliant, yielding and distensible, than subsequently, when they are firm and rigid. In this manner, it may be conceived, are effected such changes in the vascular system, as were observed in the body of Samuel Bürki, the nonagenarian cordwainer of Reynaud, and the patient of Mr Jordan.

### *Explanation of Plate IX.*

Fig. 1. View of Dr Otto's case of obstructed aorta. A, the aorta; S, the left subclavian artery; P, the pulmonary artery; D, the ligamentous *ductus arteriosus*; O, the constricted part. Case 4th.

Fig. 2. View of the obliterated aorta in the case of Samuel Bürki, (Case 5th), by A. Meckel. The letters are the same throughout.

The collateral vessels, much enlarged in this case, are represented in Plate X.

Fig. 3. View of the constricted aorta in the case of M. Reynaud. Case 6th.

Fig. 4. View of the constricted aorta in Mr Nixon's case. Case 9th.

Fig. 5. View of the obliteration of the aorta in Dr Craigie's case. The anterior surface of the vessels is seen. A, A, the aorta; I, the innominata; C, the left carotid; S, the left subclavian; P, the pulmonary artery; D, the *ductus arteriosus*; O, the obliterated part.

Fig. 6. View of the inside of the aorta, and obliterated part in the same case. A, A, the arch of the aorta, rough and irregular, from osteo-steatomatous deposition.

### *Explanation of Plate X.*

View of the collateral vessels in the case of Samuel Bürki. The situation and course of the vessels sufficiently explain themselves. O, the obliterated point opposite to the fourth dorsal vertebra; M, M, the internal mammary arteries; I, I, the superior intercostal arteries; *I, I*, the inferior intercostal arteries; T, C, the transverse cervical arteries.

N, N, N, Crescentic notches in the ribs, produced by the beating of the nlarged intercostal vessels.

## Art. XIII.—*Notice of a Case of Molluscum Contagiosum.* By William Turnbull, M. D. Physician to the Infirmary, Huddersfield.

The very interesting communications on Molluscum in the Edinburgh Medical and Surgical Journal for July last, have recalled to my mind the following case, which will probably be considered not unworthy of a place in the same publication. It is difficult to give it a satisfactory designation, as it will be found to have many points of resemblance to several, and yet not to agree accurately in character with any of the family of *Tubercula*, as given by systematic writers.

The patient was under the care of the late Mr Atkinson, Surgeon in this place, and I was requested to see him in consultation on the 28th of January 1832. He was a gentleman of spare habit, rather small stature, and swarthy complexion, with black hair. A great portion of the trunk, face, arms, and thighs, was covered with tubercles of all sizes, from the smallest visible speck to that of a plum; and three or four were as large as a moderate sized orange. They were most numerous on the fore-part of the body and thighs: and many existed on the back and neck. He had none below the knees, and only a few small ones below the elbows. The skin, where not studded with them, seemed healthy, except on the palms of the hands and soles of the feet, where it was dry, somewhat scaly and inclined to crack. The colour of the tumours was pretty uniformly of a dark mahogany hue. Some few were yellow at the top and covered with thin crusts or scabs. This state, it had been observed, was generally the forerunner of ulceration. All were firm and solid, but not hard. In shape they varied greatly, some being circular, much resembling the figure 3, given by Dr Paterson in the last number of this Journal; others were oblong; and in some parts several had coalesced, making a cluster of very irregular surface and circumference. A few rose from one inch and a-half to two inches above the surrounding surface. In general they were quite moveable, attached only to the skin, and could be pulled up so as to allow the fingers to be insinuated underneath. Three or four, however, were seemingly under the integuments and imbedded in the subjacent parts. Several were ulcerated, particularly one on the inner and upper part of the right thigh. The ulcer was nearly circular, and about four inches in diameter, with hard, prominent, and indolent looking edges. Its surface was very irregular, and divided into compartments by red-fleshy looking projections; and the whole discharged a large quantity of limpid fluid, and emitted a faint sickly odour. There was a similar but much smaller ulcer on the same aspect of the thigh, just above the inner condyle. A few tubercles in different parts had inflamed round their base, and sloughed off or been turned out, and the places, which they had occupied, had healed without leaving any depression. Little pain attended any of them, but the itching was troublesome. The number of tubercles exceeded 200. They were first observed last autumn, on the neck, thigh, and fore-arm,—and then they gradually came out over the whole body. At the time of my visit, fresh ones were making their appearance on the forehead, eyelids, nose, and cheeks. The upper lip had been studded with them, but was again free.

The general health was not good. He still attended to business, but felt very weak and languid. The tongue was white; the appetite poor; the pulse from 80 to 90; sleep disturbed; the bowels tolerably regular.

He could assign no cause for the affection, except that he had been subject almost from infancy to a scaly state of the skin, which by sea-bathing last summer had been nearly cured. He was congratulating himself on having got rid of a loathsome and troublesome complaint, when these morbid growths made their appearance.

Many medicines had been tried with little obvious benefit. In the early stage of the disease he had been twice bled from the arm, had taken sulphur and soda, and active aperients, and had been kept under the influence of mercury for a considerable period. Latterly, by the advice of Mr Hey of Leeds, he had taken arsenic, and several of the tumours had been destroyed by caustic potass. From this period I visited the patient every ten or twelve days until his death, and made use of a great variety of both external and internal remedial means. Most of the tubercles were slowly removed; some by being painted over daily with the tincture of iodine; some by its application in a more concentrated form, (iodine one drachm and a-half, iodide of potass one drachm, water one drachm,) and some again by being touched with caustic potass. Others, where the shape was favourable, were taken off by ligature, and towards the close of life, when the debility became extreme, many disappeared spontaneously. In some, as had taken place earlier in the complaint, inflammation occurred at their base, suppuration followed, and they shrunk or fell off, and healthy cicatrization completed the cure. On the other hand, those on the thigh terminated in malignant ulceration, apparently of a carcinomatous nature, which destroyed the patient. The application of caustic to the tumours caused no pain, but merely a sensation of warmth over the part. Some when the crust or eschar became detached, presented a dry and smooth and glistening surface, whilst others, called by the sufferer soft ones, had a raw cauliflower, or rather, from their hue, a raspberry appearance, and discharged much watery-looking fluid. The corion, or perhaps its outer layer, terminated abruptly by a smooth and regularly defined margin at the base of the morbid growth, where it began to rise above the adjoining surface. Indeed, the tumour had the appearance of being protruded through a hole in the integuments, and its prominent part seemed only covered by the cuticle. On the tightening of a ligature, limpid fluid issued in drops from the surface of the included part, which immediately shrunk in size. Nothing proved of permanent service to the ulcers on the thigh. They slowly extended in all directions, and at length coalesced, and towards the end of life, reached from the groin to the knee, and included half the circumference of the limb, presenting a most extensive mass of disease. The surface was foul and uneven, and had many red prominent bands and nipple-like projections of stony hardness, interspersed with sloughy cavities. From the whole, and also from a considerable portion of the surrounding integuments, which were of a dark-red hue and very hard, limpid fluid flowed in large quantity, so as to wet many folds of linen in a short space of time, and even to wash off any dressings that might have been applied. The scrotum and entire limb were greatly enlarged and anasarcous.

The general health slowly broke up. I could never detect any visceral disease; but he gradually lost flesh and strength; the pulse became more frequent, nights unrefreshing, appetite failed; and he sunk on the 5th June, apparently exhausted by the drain and irritation from the ulcerated part.

The patient was of healthy parentage, and left a family of healthy children.

*7th August* 1841.

# PART II.

## CRITICAL ANALYSIS.

Art. I.—1. *Leçons d'Anatomie Comparée* de Georges Cuvier. Recueillies et publiées par M. Dumeril. *Seconde Edition, corrigée et augmentée. Tome Premier, Contenant les Généralités et les Organes du Mouvement des Animaux Vertébrés.* Revu par M. G. Cuvier. Paris, 1835. 8vo. Pp. 587.

*Tome Seconde, Contenant les Organes du Mouvement des Animaux sans Vertèbres et l'Ostéologie de la Tete.* Revu par MM. F. G. Cuvier et Laurillard. Paris, 1837. 8vo. Pp. 726.

*Leçons d'Anatomie Comparée* de Georges Cuvier. Recueillies et publiées, par G. L. Duvernoy. *Seconde Edition, corriyée et augmentée. Tome Quatrieme, Premiere Partie, Contenant les Organes de Mastication, d'Insalivation et de Deglutition des Animaux Vertébrés.* Revu par G. L. Duvernoy. Paris, 1835. 8vo. Pp. 628.

*Tome Quatrieme, Seconde Partie, Contenant la suite de l'appareil de Chylification des Animaux Vértebres.* Revu par G. L. Duvernoy. Paris, 1835. 8vo. Pp. 691.

*Tome Cinquieme, Contenant les Organes d'Alimentation des Mollusques, des Animaux Articulés et des Zoophytes.* Revu par G. L. Duvernoy. Paris, 1837. Pp. 503.

*Tome Sixieme, Contenant la description du Fluide nourricier, de ses reservoirs, et des organes qui le mettent en mouvement, dans les quatres types du Regne Animal.* Revu par G. L. Duvernoy, Professeur au College de France. Paris, 1839. 8vo. Pp. 559.

*Tome Septieme, Contenant la description des Organes d'Elaboration et de Depuration du fluide Nourricier, par la Respiration et la Secretion Urinaire.* Revu, et entierement refondu, par G. L. Duvernoy, Professeur au College de France. Paris, 1840. Pp. 6.

2. *Outlines of Comparative Anatomy*. By ROBERT E. GRANT, M. D., &c. Professor of Comparative Anatomy and Zoology in the University of London, and Lecturer on Human Physiology. Part III. *containing Nervous System, Organs of the Senses and Digestive Organs.* With twenty-three Woodcuts. London, 1836. 8vo. P. 225 to p. 352.

Part IV. *containing Digestive Organs, Chyliferous and Sanguiferous Systems.* London, 1837. P. 353 to p. 432.

Parts V. and VI. *containing Sanguiferous System, Organs of Respiration, Organs of Secretion, Lymphatic System, and Excreting Organs.* London, 1840. P. 433 to p. 624. 14 Woodcuts.

3. *A General Outline of the Animal Kingdom, and Manual of Comparative Anatomy.* By THOMAS RYMER JONES, F. Z. S., Professor of Comparative Anatomy in King's College, London; Fullerian Professor of Physiology to the Royal Institution of Great Britain, &c. &c. Illustrated *by* 336 Engravings. London, 1841, 8vo. Pp. 732.

THE importance of Comparative Anatomy, which has been long recognized by those ingenious and philosophical inquirers who have most deeply and industriously studied the animal economy, and endeavoured to investigate the laws by which vital actions are regulated, is at length, though slowly, beginning to be understood and admitted among a few of the more intelligent cultivators of the medical profession, and among some of those bodies who regulate the course and amount of medical education. The value of this branch of knowledge as an auxiliary to physiology was well understood by John Hunter, who showed, by an example of rare industry and perseverance, how much progress may be made by one individual, not only unaided by public patronage or public resources, but even where his career is impeded by difficulties, and discouraged by want of sympathy in the value of his researches. It is perhaps good for genius that its course is opposed and thwarted by impediments; probably it acquires greater courage, better founded confidence, and more unyielding energy; and hence opposition invigorates and improves those powers which are necessary to advance, and finally to succeed in arduous and unexplored investigations. But, however this may be, certainly in this country in general there is little reason to complain that, if it be good, it is not allowed to reap the full harvest from such a crop.

It forms a striking contrast to remark, that at the time at which John Hunter, as a laborious surgeon and surgical teacher in London, was toiling for a livelihood, and devoting every hour which he could withdraw from these urgent claims, to the purchase and dissection of animals of every kind, and to the preparation and description of the organs, Daubenton, and afterwards Cuvier, were, by the aid of a great national establishment, and with the assistance of very ample pecuniary resources, enabled to devote their whole energies and time to the cultivation of the same subject in the metropolis of France.

One of the results of this public encouragement of the cultivation of the science of comparative anatomy, was the publication of the valuable Leçons of Cuvier, and the creation of a more decided taste for knowledge of this kind in France, and, it may be added, in Germany, than in most other countries. These two circumstances, indeed, act on each other; for while the existence of such a work favours and promotes, and, indeed, sometimes creates the taste for such pursuits, the taste is gratified and the study facilitated by the work. The most unequivocal proof of the intrinsic merit of that work is, that for thirty years, it continued to be the chief authority on Comparative Anatomy in Europe, and had become scarce and so much prized, that copies could no longer be procured. It was one of the last undertakings of its illustrious author to republish the work in an improved, a corrected, and an enlarged form; and though his life was terminated, before he had accomplished his task, the work will be completed by an able successor as much as possible in the manner of the author.

I. The present publication of the late M. Cuvier may be regarded as not merely a new edition, but rather a work in many respects entirely new. The original *Leçons*, or Lectures on Comparative Anatomy, though truly a great effort and a most useful publication for the time at which it appeared, in so far as it was the only complete and extended treatise on Animal Anatomy, was, nevertheless, by the nature and mode of its composition, and also from the circumstances under which it appeared, an imperfect work. They were the demonstrations or *viva voce* lectures and expositions of Cuvier, taken down in notes, and then arranged and extended, under his own eye, by his assistants, M. Dumeril and M. Duvernoy, who, doubtless, endeavoured to render the information as accurate and complete as possible. That they did not quite succeed in the attempt, and, in short, it was not reasonable to expect that they should succeed, appears very manifestly from the long list of corrections, emendations, and insertions published at the end of each volume. In short, though not composed in a hurry, yet the lectures necessarily and unavoidably partook of those errors, oversights, and defects, which often insinuate themselves into the reports of discourses pronounced in public, and especially where the teacher must trust to the objects before him, if not for the order in which he proceeds, at least for the clearness, the accuracy, and the fidelity of the descriptions.

Independently, however, of the source of error now adverted to another of a nature not less important deserves to be mentioned. At the time at which the notes of Cuvier's Lectures were arranged and published, several departments of comparative anatomy were imperfectly known; others were entirely unexplored; in all there were many errors to be rectified, many defects to be supplied, many facts to be ascertained. In this duty no one was at that time more actively engaged, now that John Hunter was no more, than Cuvier himself and his assistants, M. Dumeril and M. Duvernoy. They were daily making new dissections, new preparations, new drawings, and repeatedly examining again and comparing those already procured at the Museum of Natural History; and from the data and other authentic sources now specified, Cuvier himself was from time to time, and frequently, making corrections, and rectifications, and supplying defects in his public instructions. These circumstances placed him in the singular position of being a judge and critic on his own work, and of furnishing others endued with less candour with the means of criticising it also. The result was, that several persons, more disposed to show acuteness in finding fault than to discover merit in the labour and difficulty of writing a complete system of knowledge on a subject so extensive and complicated as comparative anatomy, were eager to represent the lectures as a work imperfect, inaccurate, and full of defects. These persons felt no shame in the reflection that, but for the labours of Cuvier, they must have been unable to see, much less to correct his mistakes, and that to him they were entirely and solely indebted for the arms by which they had attacked him.

Cuvier himself, indeed, never intended his lectures to be anything but a sketch or outline of a work more comprehensive and complete,—a temporary guide to the student, to serve until one more perfect and faultless could be prepared. With this view Cuvier had intended that the *Tableau Elementaire des Animaux*, and his work on the Animal Kingdom should be followed by what he repeatedly called his Great System of Comparative Anatomy, and in collecting materials for which he spent fully thirty years of the most active and industrious period of his life. When, however, he found himself, in the year 1827, with many preliminary researches unfinished, the period at which his plans were to be carried into effect still distant, and, above all, the impossibility of reprinting in its actual state the first edition of the Comparative Anatomy, and, nevertheless, aware of the necessity of satisfying the eagerness of the public for this work, he determined to avail himself in the meantime, as far as might be practicable, of the researches hitherto made in preparing a second edition of that work.

For an undertaking so great and laborious, however, it was requisite to have some efficient assistance; and the author could look to no one more competent than his relative and former coadjutor in this labour,—M. G. L. Duvernoy, at that time Professor of Zoology and Comparative Anatomy to the Faculty of Sciences of the Academy of Strasbourg. In January 1828, accordingly, Cuvier addressed to M. Duvernoy a note expressing his plan and communicating his wishes. According to this sketch, Cuvier himself undertook the Osteology, Myology, the Anatomical History of the Brain and Nerves, that of the Organs of the Senses, and the Anatomy of the Teeth. For the osteology and the anatomical structure of the teeth, his long-continued, elaborate, accurate, and extensive researches into the characters of the fossile bones and teeth of the Mammalia and other classes, had rendered him peculiarly well qualified. He proposed that M. Duvernoy might undertake the Anatomical History of the Viscera, or the internal organs of the chest and abdomen; and for this purpose he suggested that, in the ensuing vacation from academical duty, he should study at Paris the preparations contained in the large collection under his own care. Cuvier further suggested, that M. Duvernoy should compose one lecture or discourse on the fœtus and its investments, treating at the same time the early and detailed history of the ovum; and for this purpose he recommended as a guide the report made by himself on an analogous work of M. Dutrochet, contained in the Annales du Museum d'Histoire Naturelle. A concluding chapter he recommended to be devoted to the subject of monsters.

Cuvier seems, in contemplating this undertaking, to have been led into a mistake common to authors on complicated and extensive subjects. He recommended as an essential requisite, the necessity of his coadjutor confining himself to the most simple expressions, that is, we presume, to observe all imaginable brevity, because he proposed not to exceed six volumes. The original work was in five volumes. Many new facts had been ascertained; several new views required to be illustrated or extended; much new information had been collected and required to be communicated. The new work we shall see has already extended to seven volumes, and is not yet completed.

Meanwhile, M. Duvernoy proceeded actively with his part of the undertaking. Already he had spent several months in the years 1829 and 1830 in making the most assiduous researches in those ample collections which M. Cuvier, during a period of thirty years, had been providing for the purpose. With the same object M. Duvernoy was to spend the summer of 1832 with Cuvier. The latter was proceeding diligently and steadily with his labours; he had completed in the first volume the final views which he had matured on the fundamental principles of the science of comparative anatomy. In the course of a few weeks he would have exalted the subjects of osteology and myology to the just level of the science, when he was overtaken by that remorseless messenger who brooks no delay, and who is deaf to all considerations of how little has been done, how much is in confusion, and how much requires yet to be completed.

The unexpected death of Cuvier was followed by great inconvenience and confusion as to the completion and publication of the Treatise on Comparative Anatomy. The first volume only was in a state capable of going to press, as that was the only one at which Cuvier himself had been assiduously working. It was not, however, published till 1835, when that and the fourth, consisting of two parts, appeared at the same time. The second did not appear till 1837, some little time after the fifth, which appears to have been published in October 1836. The sixth appeared in 1839, and the seventh in 1840. The third, which is to contain the anatomical history of the nervous system and the organs of the senses, though promised in 1836 to be speedily published, has not hitherto, in 1841, made its appearance.

After these preliminary statements, we shall now take a short view of the contents of this work, and consider its qualities as a system of comparative anatomy. In so doing, it would have been more agreeable to us, and more consistent with our usual practice, had the work been completed. But as it is clear that we have little reason to expect this for some time, we yield to necessity, and must speak of the work in its present state.

1. The first volume, which received the benefit of the last labours and corrections of the author, is devoted to the general elucidation of the laws regulating the forms of organic life, and the mutual relations of the organs, and to part of the anatomical history of the organs of locomotion in the vertebrated classes. It is unnecessary to consider the particular division of that volume into lectures, which is at all times more or less artificial and arbitrary. The first lecture is devoted to the general explanation of the functions performed in the living body, and to the consideration of those marks of distinction which may be established on the differences of functions, the differences of organs, and the peculiar characters of the organic elements. The general views given in this preliminary sketch have always appeared to us highly philosophical; and even after the lapse of thirty or thirty-five years, during which most of them have been before the physiological world, they seem still interesting and perfectly correct. This dissertation, in short, is the original source from which almost all the general views on the animal world have since been drawn and distributed in multiplied channels through the writings of physiologists and zoologists.

The four subsequent lectures, which compose the volume, are devoted to the examination and detailed exposition of the bones and muscles in the vertebrated classes; and that of the analogous organs of motion in the aspondylous classes of animals is given in the beginning of volume second. Many additions are introduced; and many corrections made on the original work; and, as it has been thought expedient to preserve as far as possible the text of the original, these additions and corrections are enclosed within brackets.

2. As these four lectures, however, do not complete the anatomical history of the locomotive organs in all the animal tribes, in a fifth lecture is given the anatomical history of these organs in the aspondylous or invertebrated animals; and a sixth is employed in the consideration of the locomotive organs in action. This lecture is purely physiological, and the author gives in it very interesting views of the different sorts of station, walking, running, galloping, ambling, grasping, or seizing, springing, swimming, flying, and creeping; and of the agents by which these actions are accomplished.

The rest of the volume, by far the most considerable portion, is devoted to the osteology of the head in the vertebrated animals. In this part, the changes, additions, and rectifications, have been so numerous, so ample, and so considerable, that it may be said to be altogether new. The reasons of this are almost manifest. Many new works containing more correct views than any yet given have appeared on the cranium in the different animal tribes; much information, completely new, has been acquired; many errors have been rectified; and the whole subject had undergone such thorough revision, that the space in the first edition became inadequate.

To this subject no one had applied the powers of a vigorous mind more diligently or more successfully than Cuvier himself; and his several memoirs on Fossil Bones, and the comparison of the crania of extinct species with those still existing on the earth, furnished a most ample store for rectifying, extending, and improving the osteology of the head.

The researches of many other anatomists had contributed to increase the general stock of knowledge on this subject, and had consequently rendered it necessary to introduce a considerable amount of new matter into this part of the work. Thus the researches and observations of Oken, Spix, Bojanus, Carus, Meckel, Tiedemann, Frederic Cuvier, Blainville, Geoffroy St Hilaire, and others of less note, have invested the study of the cranial bones with a degree of importance and interest much higher than heretofore, and rendered a new description of the anatomical relations of these bones a matter quite indispensable.

To insure this and every degree and form of accuracy worthy of the subject, the authors, for we must here speak in the plurality sense, have adopted all the most likely measures. Not only had M. Cuvier himself recast this portion of his work entirely new, but it has since undergone the careful revision of two very able anatomists,—his brother, M. Frederic Cuvier, as to the head of the

Mammalia and that of the Reptiles, and M. Laurillard, as to the head of the Birds and the Fishes,—who, besides corrections, have made several important additions in various parts of the article. From this circumstance this part of the work is as perfect as to accuracy, minuteness, and amplitude, as it is possible for it to be.

This lecture is concluded with a general summary of the most important facts relative to the structure of the skull, pointing out the differences between man and the other vertebrated animals, and illustrating the question as to the skull being intended to represent one single vertebra or three or four of these bones.

3. The third volume, as we have already stated, has not yet appeared, though in 1837 it was said, that numerous materials had been already collected for it, and that it was in so advanced a state, that it was then expected to be completed in a short time. It will consist of seven lectures, devoted to the subject of the Anatomy of the Nervous System and the Organs of the Senses.

4. The parts hitherto described are those that belong to the organs of relation, the organs of animal life, or those by which *animals* are to be distinguished from vegetables. There is, however, a very important class of organs destined for the continuance of the *life* of the individual by the selection, introduction, and assimilation of food. Of these organs part are necessarily connected with those of animal life, in so far as the senses are employed in selecting alimentary articles, and recognizing their qualities, while the muscles and other locomotive agents are used in apprehending and conveying to the mouth the articles intended to be used as alimentary. Others are altogether independent of the will, and exert their powers according to different laws. This forms as it were two natural subdivisions of the organs employed in the nutrition of the animal world; the first those parts, the action of which is dependent on the will; the second those, the action of which is independent of the will.

The anatomical history of the organs now referred to is delivered in the fourth volume, which is the largest of any of those yet published. It consists of two parts, the first devoted to the history of the organs of mastication, insalivation, and deglutition in the vertebrated animals; and the second, the description of the organs of chylification in the same class. In preparing this part of the work when first published, M. Duvernoy had applied with great assiduity; for excepting part of the sixteenth lecture, which had been already prepared by M. Dumeril, he had from the notes of M. Cuvier's lectures, the preparations which Cuvier had collected, and the drawing he had made, composed the entire residual part of the work to its close, embracing the anatomy of the organs of digestion, respiration, circulation, secretion, and reproduction.

The present part also receives the benefit of his revision; and it has been manifestly greatly improved, enlarged, and amended.

Of this no part of the volume is without ample and evident marks; but if we specify any one particularly enlarged and rectified, as remarkable for the amount of correct information collected from all accessible sources, we may mention the seventeenth lecture on the teeth, their structure, their development, or growth, their various forms, and numbers in the different classes of animals; and the eighth lecture, on the mouth, lips, salivary glands, hyoid bone, and, above all, the fourth article on the tongue. On the subject of the glands, M. Duvernoy has brought forward the views of Müller; and on that of the tongue, the researches of Bauer, Blandin, and other accurate anatomists, are made available.

The second part of this volume, which is by the same author, is devoted to the anatomy of the alimentary canal, and its appendages, the liver, pancreas, and spleen; and the peritonæum, the mesenteries, and the epiploons, or omenta or cauls.

5. The materials of the fourth volume are very much enlarged beyond their measure in the first edition. Yet the descriptions therein given are those only of the chylopoietic organs in the vertebrated animals. The description of the same organs in the aspondylous tribes is given in the fifth volume; viz. the MOLLUSCA, the ARTICULATA, and the ZOOPHYTA. The descriptions of these organs occupy in the first edition about 113 pages at the end of the third and the beginning of the fourth volume. In the present edition it has been found requisite to enlarge the descriptions of this division of the animal world.

The order observed in this volume, is, so far as the similitude of organization in the animals allows, the same as that observed in volume fourth.

The first subject considered is the mouth of the Mollusca and its different parts; then the organs of insalivation; next the alimentary canal, its length, its course, and its termination; and lastly, the appendages of the alimentary canal, including the liver, and the supports and investments of the canal.

These form the subject of the twenty-second lecture.

In the twenty-third, M. Duvernoy considers in the same method and order, the different organs of the alimentary function in the articulated animals; and in the twenty-fourth, those of the radiated animals, and the zoophytes.

In the whole of these lectures, as in those of other volumes, we find all the multiplied additions, and rectifications made by many inquirers on the structure of the different parts of the alimentary canal, and its appendages, carefully introduced and noticed in their proper places.

At the close of the volume, and at the end of the twenty-fourth lecture, there is given a supplementary history of various facts and circumstances illustrating the nature of the process of digestion, viz. the description of the chemical means given to various animals for converting their aliments into a nutritious fluid, viz. the saliva, gastric juice, intestinal fluids, pancreatic fluids, and the liver and the bile in the different classes of animals. The observations and experiments of Eberle and Schwann, formerly noticed in this Journal, are introduced.

6. After food has been introduced into the bodies of animals, and undergone those changes which fit it for the purposes of nutrition, it requires to be conveyed into the vascular system, and mixed with the mass of blood, in order to be distributed with it through the system at large. For these purposes, two orders of vessels are set apart; the lacteals and lymphatics, and the blood-vessels.

The consideration of the anatomy of the parts concerned in this important function forms the subject of the sixth volume of the work.

The author begins in the twenty-fifth lecture with the chemical constitution and physiological history of the chyle, the lymph, and the blood; and next considers the reservoirs or receptacles for these fluids, including under this head the lymphatic vessels in general, and the lymphatic glands, the arteries, the veins, and the heart. The consideration of the anatomy of these parts in the vertebrated animals forms the subject of the twenty-fifth lecture.

In the twenty-sixth lecture the same organs are considered in the Mollusca; in the twenty-seventh in the articulated animals; and in the twenty-eighth in the radiated and the zoophytes. The whole is wound up with a general summary of the four previous lectures, containing many new points, which have been brought to light, during the period that the volume was in the course of composition.

This summary forms a most instructive general view of the process of the absorption of the chyle, and its admixture with the blood, and we should have been happy to transfer it either in whole or in an abridged form to our pages. This, however, our limits do not permit us at present to do; and we must be content with recommending our readers to peruse it carefully, in the hope that on some future occasion we may give the substance of it.

In giving the chemical and physiological history of the blood, M. Duvernoy introduces all the facts ascertained by the researches of Wagner, Valentin, Mandl, and Donné, upon the blood of the vertebrated animals, and those by Milne-Edwards on the blood, the blood-vessels, and the circulation of the Annelides.

7. When the nutritious fluid has been conveyed into the system, it is mixed with the venous blood, or that portion of the circulating fluid which has already performed the round of the circulation, which has served the purposes of furnishing their appropriate materials to each texture, and thus supplies the waste and the tear and wear of the machinery of the system. The united mass thus formed of circulated fluid, and new or crude nutritious matter, is

not in a state to be applied to the purpose of the repair of waste, until it has undergone another and a most important change.

The conjoined mass, indeed, arrives at the right auricle or the termination of the venous system in the vertebrated animals, divested of its most energetic and vital properties, a dull sluggish current, loaded with impurities, and requiring to undergo some very considerable depuration, before it can be again distributed through the economy. According to the observations of the most accurate and sensible physiologists, it both acquires something new, and it parts with something already used, in undergoing this change. The change, which, from the manner in which it is performed in the vertebrated animals, is denominated respiration, is accomplished in the lungs, or in gills in the case of fishes, and certain of the aspondylous tribes, or in large spiracula or tubes terminating on the surface of the body, as in the case of the articulated animals.

The anatomical history of the organs by which this function is accomplished, as well as the physiological explanations necessary to understand the relative influence of each part of these organs, is delivered in the seventh volume.

M. Duvernoy begins with an account of the action of the air on organization in general, and on the nutritious fluid in particular, by the intervention of the organs of respiration, and takes a view of the qualities of that fluid, and the changes which it undergoes in respiration. He then describes the structure of the lungs in the vertebrated animals, and the gills in reptiles and fishes; then the mechanism of pulmonary respiration in man and the Mammalia, and in birds and reptiles with lungs, and next, the mechanism of branchial respiration, or that performed by means of gills in reptiles and fishes. These subjects are discussed in the twenty-ninth lecture, which occupies about one-half of the seventh volume.

In the thirtieth lecture, he enters on the examination of the respiratory organs in the Mollusca, in which the process is performed by gills, partly external, partly internal; next, the same organs in the articulated animals; and lastly, those in the zoophytes.

The process of respiration has a sort of definite locality in the system by means either of the lungs or the gills. But it is believed and taught by several eminent physiologists, that, in addition to this local respiration or depuration of the nutritive fluids, there is a sort of general process diffused through the system, and in which different organs perform a part. Thus, it is taught that the lungs, the kidneys, and even the skin are all accessary organs of respiration.

The liver was already described as an important organ in the performance of the alimentary function; and consequently does not require to be considered in this place, more than in the mere mention of its character in the respect now specified. The skin comes under the head of the integumentary organs; and though its importance as a respiratory organ remarkably augments in the reptiles, and in the whole tribe of aspondylous animals, and especially in the Articulata, and Annelides, it is not deemed expedient to introduce its anatomy under the present head.

The only organs, therefore, which fall to be particularly and fully examined under the head of supplementary respiration, as it were, are the kidneys, the urine, and apparatus by which this excrementitial matter is eliminated from the system. The anatomy of these organs, therefore, and all the facts illustrating their function, are delivered in the thirty-first lecture. This is followed by an appendix containing some additions, and a general summary upon the principal organic characters of the different forms of the apparatus of respiration in the animal kingdom at large. This summary, though less ample than that at the end of volume sixth, on the nutritious fluid and its receptacles, is nevertheless very instructive, and may be recommended as presenting in a short compass the principal physiological relations and purposes of respiration in the different classes of the animal world. With this summary the seventh volume is concluded, and consequently the work, so far as it has hitherto gone.

8. There still remain to be treated the organs of voice, those of reproduction, the development of the fœtus, and the history of monsters. According to the original plan, these were to have occupied the sixth volume; and, according to a modification of this plan, they were to have been treated in the seventh volume, which is already completed, without one of them having been touched. We believe that, if they be treated with the same proportional amplitude of detail, with which the other subjects have been considered in the volumes already published, they will require, at least, two other volumes; so that, at the present rate and scale of description, the work will not be completed in less than other two volumes.

This, we think, can be regretted by no one. The truth is, that the subject is itself so complicated and extensive, and requires the introduction of so many additional facts and details in order to make it reasonably complete, that it is not wonderful that the authors have been mistaken in the extent of their task, and have gone far beyond the limits originally assigned to it. The subjects of circulation and respiration are so extensive and difficult, and they have received so many additions, and rectifications, that it is not wonderful that the work has been so much enlarged. The development of the fœtus itself would alone require a volume, if we remember that it is requisite to notice shortly, if not fully to introduce, the researches and the results obtained by Baer, Rathke, Velpeau, Breschet, Pander, Valentin, Allen Thomson, Barry, and various other inquirers.

Connected with these is one circumstance of which we must not lose sight in speaking of the present work. Though in the first and second volume, much of the materials of the first edition have been advantageously retained, it has been found quite impracticable to adhere to this method in the later volumes; and as the work advances, it acquires more completely the character of a new work. Thus the fourth volume contains more than one-half of new materials; and the fifth, sixth, and seventh may be said, excepting the outline, to be altogether new. It is impossible to doubt, that the part of the work yet to appear will be equally new and original, if not more so than that which has already appeared.

The work, when completed, will form the most perfect treatise on comparative anatomy extant, both as to the philosophical soundness of the views, and the amplitude, and also as to the accuracy of the particular details.

II. We have now to direct the attention of our readers to two English works on the same subject.

It is singular to observe, that, while both France and Germany could boast of original treatises or comparative anatomy, in England, the student had only foreign works or translations from which he could obtain the necessary instruction. Excepting the rather meagre compendium by Mr Fyfe of this city, there was no treatise by any English writer to which the student could advantageously refer. This defect was first attempted to be supplied in 1807, by Mr Laurence, by an English translation of the small but very clear and methodical manual of Blumenbach, with various additional descriptive details introduced from the work of Cuvier. The second edition of this work, published in 1827, by Mr Coulson, was noticed in our thirty-first volume, (p. 411.) A similar attempt of the same kind in 1827 was the translation of the work of Carus from the German, also noticed at the same time with the second edition of the translation of Blumenbach. Subsequently, in 1828, the French translation of the System of Meckel formed a valuable addition to the library of the student in comparative anatomy.

Still no original work in English could be mentioned as entitled to the character of a useful guide to the student; till in 1835, appeared the first and second parts of the outlines of Dr Grant, of which we gave a short account in our forty-fourth volume, (p. 508.) Since that time, the third and fourth numbers have appeared; and, according to the first prospectus, these were to have completed the volume. According to a subsequent intimation in the third part, it was to have been completed in the fifth number. This, however, neither the fourth nor the fifth number did. The fifth and sixth parts have appeared, as announced in the beginning of this article; but they do not conclude the work; and we are not informed what is the conclusion of the work, or when it is to be concluded.

The third part of Dr Grant's Outlines contains the conclusion of the fourth chapter, viz., the description of the structure of the nervous system; the fifth chapter, devoted to the anatomy of the organs of the senses; and the beginning of the second part of the work, viz. that on the organs of vegetative or organic life, including a considerable portion of the descriptive anatomy of the organs of digestion. The fourth part contains the larger concluding portion of this chapter, a short chapter (chapter II.) on the chyliferous system, and a small part of the chapter (III.) on the sanguiferous or circulating system.

On the arrangement observed by Dr Grant, it is almost superfluous to say anything additional to what we formerly stated. Dr Grant, in his survey of the organs, begins, it will be remembered, with those classes of animals, the structure of which is most simple, and which are, therefore, placed at what is termed the first part of the scale. Thus, after considering the forms and structure of the nervous system in the radiated and articulated animals, he advances to those which it presents in the vertebrated classes. There also he observes the same method; beginning first with the nervous system in fishes, then considering that in the tadpole reptiles, then in the reptiles, next in the birds, and lastly, in the mammalia.

·In the same manner he unfolds the anatomical structure of the organs of sensation. After some general observations on the organs of the senses, he considers that of vision successively in the zoophytes, the articulated animals, the insects, the mollusca, the fishes, reptiles, birds, and mammalia. The organ of hearing is examined in the same manner, and the modifications which it undergoes are successively described. The organs destined for the exercise of smell, taste, and touch, are described in the same manner as in those classes in which they are distinctly susceptible of demonstration.

This concludes, as has been already stated, the first division of the work, or that devoted to the anatomy of the organs of relation.

Under part second, the description of the organs of digestion occupies a large space, and forms, indeed, an interesting part of the work. Dr Grant describes the form, disposition, and extent of the digestive organs successively in the cyclo-neurose, or radiated classes of animals, in the diplo-neurose, or articulated classes, in the cyclo-gangliated, or molluscous classes, and then in the different divisions of the vertebrated animals.

The anatomy of the chyliferous system is treated more shortly, in consequence of the absence of this intermediate system in the radiated and other inferior classes, and the simplicity and uniformity of structure observed in the higher classes.

On the description of the sanguiferous system, the author merely enters in the fourth number.

The third chapter, the greater part of which is contained in part fifth, is devoted to the anatomical history of the sanguiferous system, and furnishes a full, accurate, and interesting accôunt of the various forms which that system presents in the different classes of the animal world. The author traces the organs concerned in this function from their first rude and simple form in the zoophytes and articulated classes, to their more complete and complex structure observed in the vertebrated classes. This forms an interesting chapter to the physiological student, and we would recommend it to his attentive perusal. The following observations, with which the author concludes the chapter, may be presented as exhibiting a general view of the circulating organs, and the unity of plan upon which they are formed in the different divisions of the animal kingdom.

"The various grades of development in the sanguiferous system, thus traced throughout the animal kingdom, are successively represented in the transient forms which this system assumes during its development in all the higher animals and man. The colourless blood of the embryo at first moves through the germinal membrane in two contiguous circles, like that of the lowest annelides; and when, at length, vessels are distinctly formed, the pale red blood continues to circulate in closed arteries and veins, without the aid of a heart, as in all the radiated and many higher tribes of animals. The pulsating, heart-forming centre of this system, becomes, as in worms and insects, a dilated dorsal vessel; and the *punctum saliens* forms a muscular ventricle, which developes an auricle behind it, and a *bulbus arteriosus* on its anterior part. Beyond this bulb, the aorta early divides into five successive pairs of deciduous branchial arteries, and the embryonic branchial openings on the sides of the neck have been retained to maturity, as an abnormal condition, in the human body. The cavities of the heart lose their primitive rectilineal position, which they retain in gasteropods; the auricle gradually doubles up behind the base of the ventricle, and arrives at that dorsal position, with regard to it, which it retains in fishes; the two ends of the primitive, continuous, heart-forming, dorsal vessel, are now become *posterior vena cava* and *aorta*, where the blood still moves through the cavities of the heart, as in insects, from behind forwards.

"The three anterior branchial arteries, forming simple aortic arches in man, as in mammalia, birds, and reptiles, are successively converted into the ascending trunks from the arch of the aorta. The fourth arch forms the descending aorta, and the posterior arch the pulmonary arteries, as during the metamorphosis of a frog. So that man's vascular system, arrived at the possession of a single muscular ventricle, represents that of the highest crustacea; with an auricle and ventricle placed in a line, it becomes that of a gasteropod; and with a developed *bulbus arteriosus*, an auricle advanced upon the ventricle, and the aorta divided into branchial arches, it is raised to that of fishes—the embryos of all higher vertebrata.

The development of a second auricle by a septum rising through the first, the partial division of the ventricle by a muscular septum, the imperfect separation of the venous from the arterialized blood, the entire metamorphosis of the branchial arches, and the development of the pulmonary arteries, change, at length, this system of the human embryo to that of an air-breathing reptile. The ascending septum of the yet single ventricle, draws up and cleaves the apex of the embryo's heart, and makes it double, like that preserved through life in the lamantin and the dugong; and this septum, on reaching to the origin of the still single systemic artery, divides it also to the extent of the *ductus arteriosus*, and entirely severs that portion containing the pulmonary arteries from the primitive bulb of the aorta. The septum of the auricles is developed in man as in the reptile, before that of the ventricles; but the septum of his ventricles is necessarily completed before the entire separation of the auricles at birth, by the closing of the *foramen ovale;* and the reptile circulation of man in the amniotic fluid must be continued for a time, by a different route from that followed in the air-breathing animal.

" The arterial blood of the human fœtus (142. B. C.), as of other mammalia, ærated and replenished by traversing the placenta, is returned by the umbilical vein (B. 4.), to be sent, along with the visceral blood poured into it from the *vena portæ* (B. 1. 2. 3.), through every part of the liver (B. 5. 6.) A small portion only of the placental fluid now follows its primitive course, from the umbilical vein(B. 4.) directly through the *ductus venosus* (B. 7.) into the inferior *vena cava* (B. 11.) The portal blood (B. 1. 2. 3.) entering the dilated sinus (B. 5.) of the umbilical vein (B. 4.) is distributed with that of the minute hepatic artery, chiefly through the right lobe (B. 6.) of the liver, which here is less than the left. The arterialized fluid received from the hepatic veins, (142. C. *c.*) and the *ductus venosus* (C. *b.*) is conveyed, along with the blood of the *abdominal cava* (C. *a.*), into the great *vena cava* inferior (C. *d.*) and the right auricle (C. *e.*) of the heart. By the aid of the Eustachian valve, it is directed from the right auricle (C. *e.*), through the *foramen ovale* (C. *p.*), into the left auricle (C. *f.*), where it mingles with the blood from the yet small pulmonary veins (C. *v.*) From the left auricle (C. *f.*), this ærated placental fluid is conveyed through the left auriculo-ventricular orifice, into the left ventricle (C. *g.*) of the heart, by which it is propelled into the aorta (C. *h.*) and into all the branches (C. *i. k. l.*) ascending from its arch, to nourish and develope the brain, the organs of the senses, and all the important anterior parts of the body, so early and largely developed in the fœtus.

" The blood thus rendered venous by affording nutriment to the larger anterior half of the body, is returned in an impure state, by the superior *vena cava* (C. *n.*), to the right auricle (C. *e.*) By the right auriculo-ventricular orifice it passes directly into the right ventricle (C. *o.*), which propels it into the pulmonary artery (C. *r.*), the *ductus arteriosus* (C. *t.*), and the descending aorta (C. *m.*), to afford a scanty nutriment to the small posterior parts of the trunk and the limbs, and to proceed in mass through the large umbilical arteries (142, B. *u. v.*) for fresh oxygenation in the placenta. A small portion only of this blood is yet sent by the right (C. *s.* B. *h.*) and left (C. *u.* B. *i.*) branches of the pulmonary artery (C. *r.* B. *g.*), to the rudimentary and ineffective lungs; and the external and internal iliacs are yet but small branches of the great umbilical arteries which here form the bifurcation of the aortal trunk. Both ventricles thus combine to propel the vital fluid through the system of the fœtus, and through the long and tortuous windings of the umbilical and placental vessels, and a mixed blood circulates through the arteries of the body, as through the body of a cold-blooded reptile. It is only by the subsequent closing of the umbilical arteries and vein, and the obliteration of the *ductus venosus*, the *foramen ovale,* and the *ductus arteriosus,* that man's circulating system is raised to the mammiferous type, after a proteus-like career through every inferior form presented by this system throughout the animal kingdom."—Pp. 518–520.

These views are highly philosophical, and may be regarded as the general results deduced from an enlarged survey of the disposition and structure of the circulating organs, and the nature of the function they are destined to perform in the animal body. We see here that, however simple be the apparatus of circulation in the radiated and articulated classes, and however imperfectly it may seem to perform its functions, when contrasted with the complex and powerful machinery of the vertebrated animals, yet there is a period in the existence of these vertebrated animals, and in that of man himself, at which their organs are constructed in the same manner, and fashioned according to the same type.

These views, also, are useful in enabling us to comprehend many of the peculiarities in the fœtal circulation of the vertebrated animals, which at first sight seem anomalous and not easily explicable.

The fourth chapter, which is devoted to the organs of respiration, contains a full and elaborate exposition of the anatomical structure of the organs devoted to that function and its dependent function of voice, in the several classes of the animal kingdom.

The anatomical history of the organs of secretion follows next in chapter fifth. And here also the author gives as ample and detailed a description of this important part of the animal economy as the limits of his work allow.

The sixth chapter, on the lymphatic system, though shorter, is sufficiently full; and Dr Grant has given under this head, as indeed in all parts of his work, whatever information was most recent and most accurate, including the researches of Muller and Panizza.

The seventh chapter is devoted to the subject of the excreting organs. Of this chapter a small part only is published, and with this the work in its present shape is concluded.

The descriptive parts are performed with the elaborate accuracy and fidelity for which Dr Grant is remarkable. The intimate acquaintance which Dr Grant possesses with the structure and habits of the animals least known to anatomists and naturalists, appears to great advantage in these descriptions ; and his long familiarity with the subject, and his philosophical turn of mind have enabled him to give views highly interesting and instructive.

These circumstances make us regret that the work is not completed; for we are led to infer, from the character of that portion already published, that the entire work would not only present an appearance of unity and consistence which it is difficult to ascribe to an incomplete treatise, but would constitute an excellent compendious system of comparative anatomy.

We would be happy to see Dr Grant correct the press more accurately, and not allow such slips to occur as Trembly for Trembley, (431) ; *peetinaria* for *pectinaria*, (443) ; hephatic for hepatic, (501) ; myxene for myxine, (597) ; *asellii* for *Asellii*, (623) ; with others which we have not leisure at present to notice.

III. Meanwhile, it is our duty to direct the attention of our readers to another work which has just appeared on the same subject, viz. the General Outline of the Animal Kingdom and Manual of Comparative Anatomy, by Mr Thomas Rymer Jones.

Nothing tends so much to improve and to rectify classification as a more perfect and enlarged knowledge of the tribes and families and individuals to be classified ; and nothing tends so directly to give philosophical views to methods of arrangement, as just and correct notions of the structure and actions of even the most insignificant and apparently contemptible portions of the tribes and families of the objects to be classified. In the eye of philosophy, indeed, nothing is contemptible, nothing unworthy of attention and investigation ; and it often happens that the objects which, from habit and association, are not calculated to attract curiosity or attention, are, notwithstanding, highly deserving of minute investigation ; and when their history become known, afford grounds for modifying and rectifying all our previous notions.

Such particularly is the case with comparative or animal anatomy. It has been so much the practice among anatomists to study the structure of the mammalia and the vertebrated animals, and, in their researches into the varieties of the animal kingdom, to regard the organs and organization of this order as the type or standard, that the ideas of anatomists were long narrow and limited, and formed by no means in accordance with the extent, the variety, and the singular and extraordinary types which different organs present in different divisions of the animal kingdom. The attentive and profound examination of many of the tribes of animals without vertebræ, by Cuvier, Lacepede, Grant, and many other inquirers, has removed the veil which hung over this division of the animal kingdom, and has enabled zoologists and zootomists to form classifications upon more extended and more philosophical principles. During the period of obscurity and comparatively limited information referred to, the usual practice was to direct the attention chiefly, if not solely, to the vertebrated animals; while the invertebrated or Aspondylous, much more numerous and multiplied, are passed in comparative indifference. A great and beneficial change in this method of treating the subject has been the result of more extensive knowledge and more correct ideas. This consists in beginning with these animals in which the structure is most simple, and ascending gradually to those in which it is most complicated. We mentioned in our account of the comparative anatomy of Carus, that he was the first author who applied this method in a systematic treatise. The method was afterwards, as we have shown, adopted by Dr Grant, who, we think, improved it, by rendering it clearer and more intelligible. It is also employed by Mr Jones, who has, perhaps, by the mode in which he has completed the details, filled up the outlines of the plan more ably than any previous author.

The division and arrangement of the animal world employed by Mr Jones is founded on the following facts and principles.

The form, the extent, and the simplicity or complexity of the nervous system seems equally in the higher and lower classes of the animal creation, in the perfect and the imperfect animals, to furnish the true basis of all rational and useful distinctions. In that extensive family of animals distinguished by a radiated structure, or an arrangement of parts from the centre to the circumference, the existence of a distinct nervous system was long a matter of uncertainty; and hence it was not easy to establish good distinctive characters. So far, however, as they have been examined, it appears that in some a nervous system is perceptible, and, in others, of them no traces of this system can be recognized. The latter, in which no traces of nervous system are to be distinguished, and the structure of which, therefore, makes a near approach to that of the vegetable world, have been collected, in one large order or subordinate class, under the designation of AKRITA, (α *priv.* and χϱινω,) or the INDISCERNIBLES. As some zoologists, however, believe that these animals are provided with nerves, and that they are so minute as to elude our means of observation, they have been denominated also the CRYPTONEURA, or animals with concealed nervous system. They have been also named PROTOZOA, because they present the first forms of animal life ; and Carus, who considers them as similar to the ova of the more perfect animals, applies to them accordingly the name of OOZOA.

The AKRITA, therefore, or the Indiscernible, form the first division of the RADIATA.

They comprehend the following five orders: 1. Sponges; 2. Polypi; 3. Polygastric Animalcules; 4. Acalephæ, or Sea-Nettles; and 5. the Parenchymatous Entozoa, or Sterelmintha.

In another tribe of the same class of radiated animals, filaments, reputed nervous, are distinctly visible; and as these are presented in the form of mere threads, they have received from Mr Owen the designation of NEMATO-NEURA, or the Nemotoneurose animals. This second tribe of animals consists also of five subdivisions: 1. The Bryozoa or Polypi with ciliated arms; 2. The Rotifera; 3. the Epizoa; 4. The Cavitary Entozoa, or Coelelmintha; and 5. the Echinodermata.

Rising above the radiated animals in general structure, and in the more highly developed form of the nervous system, are the Articulated animals of Cuvier, in so far as they present masses of nervous matter, collected in a twofold series or chain of centres or ganglioform bodies placed in parallel lines, anterior and posterior, along the whole length of the body. It is chiefly from these circumstances that they have received from Mr Owen the name of HOMOGANGLIATA, and from Dr Grant that of DIPLONEURA.

This tribe consists of six subdivisions: 1. the *Cirrhipeda*; 2. the *Annelida*; 3. the *Myriapoda*; 4. the *Insecta*; 5. the *Arachnida*; and 6. the *Crustacea*.

Another tribe, in which the nervous system presents a *still* more complex, and, as it is believed, perfect and elevated type of formation, is that which has been long known by the name of *MOLLUSCA*, the HETEROGANGLIATA of Mr Owen, and the CYCLOGANGLIATA of Dr Grant. This tribe, like the last, includes the six following divisions: 1. *Tunicata*; 2. *Conchifera*; 3. *Brachiopoda*; 4. *Gasteropoda*; 5. *Pteropoda*; and 6. *Cephalopoda*.

The whole of the tribes of the animal world now enumerated, however well their latter divisions may be distinguished by the increasing development of the nervous system, all, nevertheless, agree in this important circumstance, that the central portion of the nervous system is by no means very symmetrically or well organized, and is not contained within a particular cavity constructed for that purpose. As we extend our survey of the animal kingdom, however, we find a numerous and important class of animals in which the nervous system is formed and arranged upon a new and peculiar type, giving the idea of a higher degree of development, and a more perfect species of organization. This consists in the central portion of the nervous system forming one continuous body, consisting of different parts or divisions, but all contained within a cartilaginous or bony canal, occupying the dorsal region of the animal. The central portion of the nervous system thus in continuity, and with increased development, constitutes the cerebro-spinal axis; and its anterior or cephalic or atlantal extremity is formed of those ganglia which are more especially in relation with the principal senses and the higher powers of intelligence; and the mass thus formed is denominated encephalon or cranial brain, or simply brain.

This tribe or class is denominated the VERTEBRATA, or vertebrated animals, that is, animals provided with vertebræ or a spinal canal; they are the MYELENCEPHALA of Mr Owen, and the SPINICEREBRATA of Dr Grant. They consist of five subdivisions or families, distinguished further from each other by certain degrees of increasing development in the cranial or anterior division of the cerebro-spinal axis. These subdivisions are, 1. Fishes; 2. Amphibia; 3. Reptiles; 4. Birds; and 5. Mammalia.

This is the arrangement adopted by Mr Jones in the present volume; and, according to this arrangement, he treats of the anatomical structure of the different classes, orders, tribes, and families of the animal kingdom.

The author begins with the animals at the lowest point in the scale of organization, namely, the sponges and polypi, and polygastric or infusory animals; and ascènds gradually in his descriptive details until he reaches the vertebrated classes. These details are delivered with great clearness and accuracy; and, either by the mode in which they are made to succeed each other, or by the points which the author selects from prominent consideration, they are invested with much interest, and convey much instructive information.

To communicate some idea of the mode in which the author describes his objects, we give the following extract on the respiratory organs of insects, and the nervous system of these animals.

> "The respiratory organs of the INSECTA, as well as their circulatory apparatus, are constructed upon peculiar principles, and are evidently in relation with the capability of flying, which distinguishes these minute yet exquisitely constructed articulated animals. Any localized instruments for breathing, whether assuming the shape of branchiæ or lungs, would materially have added to the weight of the body, and moreover have rendered necessary an elaborate apparatus of arteries and veins for conveying the blood to and fro for the purpose of purifying it by securing its exposure to the influence of air. By the plan adopted, however, all these organs are dispensed with; and the organs of respiration, so far from increasing the weight of the animal, actually diminish its specific gravity to the greatest possible extent. The blood, in fact, in insects is not brought to any given spot to be exposed to oxygen, but the air is conveyed through every part of the system by innumerable tubes provided for that purpose, and thus all the complicated parts usu-

ally required to form a vascular system are rendered unnecessary. These observations, however, only apply to the insect in its perfect state; for in the larva and pupa condition, where flight is not possible, various additional organs, frequently of considerable bulk, are provided, that we shall speak of in another place. If we examine the external skeleton of any large insect, a beetle for example, we shall find between the individual segments of the body minute apertures or pores (*spiracles*) through which the air is freely admitted; these openings, ten in number, on each side of the body, are situated in the soft membrane interposed between the different rings, and not in the rings themselves,—a provision for the purpose of allowing their orifices to be opened or closed at pleasure, instead of being rigid and motionless. The margin of the spiracle is frequently encompassed by thick horny lips, which may be approximated by muscles provided for the purpose, so that the opening can be shut at pleasure, in order to exclude any extraneous substances that might otherwise obtain admission: in many insects, indeed, especially in beetles which crawl upon the dusty ground, an additional provision is necessary to prevent the entrance of foreign matter, and in such cases the spiracles are seen to be covered with a dense investment of minute and stiff hairs, so disposed as to form a sieve of exquisite fineness; a beautiful contrivance, by which the air is filtered, as it were, before it is allowed to pass into the breathing-tubes, and thus freed from all prejudicial particles. From every spiracle is derived a set of extremely delicate tubes (*tracheæ*), that pass internally, and become divided and subdivided to an indefinite extent, penetrating to every part of the body, and ramifying through all the viscera, so that air is thus supplied to the entire system. Upon more minutely inspecting these air-tubes, they are found to assume various forms in different parts of the body, being sometimes simple tubes of exquisite delicacy; in other cases they present a beaded or vesicular structure, and in many insects they are dilated at intervals into capacious cells or receptacles, wherein air is retained in great abundance. The figure in the following page (*fig* 118), taken from Strauss Durckheim's elaborate work upon the anatomy of the cockchafer, will illustrate this arrangement. The spiracles, situated at the points respectively marked by the letters *a, c, d, e, f. g, h, i*, open into two wide air-trunks, disposed longitudinally along the whole length of the body: from these, innumerable secondary branches are given off, many of them being seen to dilate into oval vesicles, from which smaller tracheæ proceed; while others, without any vesicular enlargement, plunge at once into different textures, and supply the viscera and internal organs. The muscular system, the legs, the wings, the alimentary canal, and even the brain itself, are permeated in all directions by these air-conducting tubes, and thus the oxygen penetrates to every corner of the body.

"There is one circumstance connected with the tracheæ, which is specially deserving of admiration, whether we consider the obvious design of the contrivance, or the remarkable beauty of the structure employed. It is evident that the sides of canals, so slender and delicate as the tracheæ of insects, would inevitably collapse and fall together, so as to obstruct the passage of the air they are destined to convey; and the only plan which would seem calculated to obviate this would appear to be, to make their walls stiff and inflexible. Inflexibility and stiffness, however, would never do in this case, where the vessels in question have to be distributed in countless ramifications through so many soft and distensible viscera; and the problem, therefore, is how to maintain them permanently open, in spite of external pressure, and still preserve the perfect pliancy and softness of their walls. The mode in which this is effected is as follows:—Between the two thin layers of which each air-vessel consists, an elastic spiral thread is interposed (*fig.* 119, *a*), so as to form by its revolutions a firm cylinder of sufficient strength to insure the calibre of the vessel from being diminished, but not at all interfering with its flexibility, or obstructing its movements; and this fibre, delicate as it is, may be traced with the microscope, even through the utmost ramifications of the tracheæ,—a character whereby these tubes may be readily distinguished.

"We must now consider the mechanism by which air is perpetually drawn into the body of the insect, and again expelled. If the abdomen of a living insect be carefully watched, it will be found continually performing movements of expansion and contraction that succeed each other at regular intervals, varying in frequency, in different species, from twenty to fifty or sixty in a minute, but occurring more rapidly when the insect is in a state of activity than when at rest. At each expansion of the abdomen, therefore, air is sucked in through all the spiracles, and rushes to every part of the body; but, when the abdomen contracts, it is forcibly expelled through the same openings. Burmeister even supposes that the humming noises produced by many insects during their flight, must be referred to the vibration caused by the air streaming rapidly in and out of the spiracular orifices. Insects which live in water are obliged, at short intervals, to come to the surface to breathe, at which time they take in a sufficient quantity of air to last them during the period of their immersion; but if the spiracles are closed by any accident, or by the simple application of any greasy fluid to the exterior of their body, speedy death, produced by suffocation, is the inevitable result."—Pp. 264–267.

Then come the circulating organs.

"A moment's reflection upon the facts above stated, concerning the respiration of insects, will suggest other interesting views connected with the physiology of these little creatures. It is evident, in the first place, that their blood is all arterial; they can have no occasion far veins, as they have no venous blood, the whole of the circulating fluid being continually oxygenized as its principles become deteriorated. The perfection of their muscular power, their great strength and indomitable activity, are likewise intimately related to the completeness of their respiration; so that the vital energies of the muscular system are developed to the utmost, endowing them with that vigorous flight and strength of limb which we have already seen them to possess. It must likewise become apparent, that, as the blood is freely exposed to the influence of oxygen in every portion of the insect to which the air-tubes reach, one great necessity for the existence of a circulatory apparatus is entirely done away with, and as we have observed before, all those parts of the vascular system required in other animals for the propulsion of the vitiated blood through pulmonary or branchial organs, are no longer requisite; so that, by dispensing with the complicated structures usually provided for this purpose, the body is considerably lightened. The circulation of the nutritive fluids is in fact limited to their free diffusion amongst all the internal viscera, and is effected in the following manner:—If we examine the back of a silkworm, or of any transparent larva, a long pulsating tube is seen running beneath the skin of the back, from one end of the body to the other; its contractions may readily be watched; they are found to begin at the posterior extremity, and are gradually continued forwards, so that the vessel presents a continual undulatory movement, by which the fluid contained in its interior is pushed from the tail towards the head. This dorsal vessel, which may be so well observed in the thin-skinned larva, exists likewise in the perfect insect, although, from the opacity of the integument, its movement is no longer apparent, except by the vivisection of the animal.

" This dorsal vessel, or heart, as we shall call it for the sake of brevity, is organized in a very singular manner; for, instead of being a closed viscus, it communicates most freely, through several wide lateral apertures, with the cavity of the abdomen, and from thence derives the blood with which it is filled. The dorsal vessel is widest in the abdominal region; but is continued, nevertheless, through the thorax into the head, where it terminates as a simple or furcate tube, that is not closed, but open at the extremity.

" The structure of this remarkable heart has been fully investigated by Strauss Durckheim, and is extremely curious; it consists, in the *cockchafer*, of eight distinct compartments, separated from each other by as many valves formed by productions from the lining membrane, and so disposed that the blood passes freely from the hinder chambers into those which are placed more anteriorly, but is prevented from returning in the opposite direction.

" Each compartment of the dorsal vessel communicates by two wide slits, likewise guarded by valves, with the cavity of the belly, so that fluids derived from thence will readily pass into the different chambers, but cannot again escape through the same channel. The arrangement of these valves will, however, be best understood by reference to the accompanying figure (*fig.* 120), representing a magnified view of the interior of a portion of the heart of the cockchafer, as depicted by the celebrated entomotomist above alluded to. The organ has been divided longitudinally, so that one-half only is represented in the figure upon a very large scale. The compartments (*a*, *a*, *a*) are distinctly composed of circular muscular fibres; the large valves (*d*, *d*) separate the individual chambers, allowing the blood to pass in one direction only, viz. towards the head; while the openings (*c*), likewise closed by semilunar membranous valves, admit blood from the cavity of the abdomen, but effectually prevent its return."—Pp. 267–269.

The anatomy of the nervous system is not less interesting.

"In the nervous system of the INSECTA, we have many interesting illustrations of that gradual concentration of the parts composing it, and consequently of increased proportionate development of the nervous centres, corresponding with the more active movements and higher faculties by which the class before us is so remarkably distinguished from those forms of articulated animals that we have hitherto had an opportunity of examining. The supra-œsophageal ganglion, or brain, assumes a preponderance of size in relation to more perfect organs of sense, and to instincts of more exalted character; the chain of ganglia placed along the floor of the abdomen, is composed of a few large masses of sufficient power to animate the strong and energetic muscles of the limbs; and, moreover, anatomists have detected the existence of an additional nervous apparatus, apparently representing the sympathetic system of vertebrate animals, which is distributed to the viscera appropriated to digestion: each of these divisions will therefore require a separate notice.

"The brain, or encephalic ganglion (*fig.* 121, 1), is a nervous mass of considerable size placed above the gullet; it consists essentially of two ganglia united into one mass, and from it all the nerves appropriated to the special instruments of the senses are derived, so that it may naturally be regarded as the chief seat of sensation and intelligence. The nerves originating from this common sensorium are seen upon an enlarged scale in *fig.* 122: they are the *optic* (*fig.* 122, *a*,) supplying the eyes, and the *antennal* (*fig.* 122, *e*), which run to the special instruments of touch, or *antennæ*, organs of a very singular character that we shall examine more minutely hereafter. Two other cords of variable length (*fig.* 122, *g*, *g*) are given off from the inferior aspect of the brain, and serve to connect it with the anterior ganglion of the ventral chain (*fig.* 122, *h*), to which some writers have thought proper to give the name of *cerebellum*, though upon what grounds it is difficult to conjecture; the mass last mentioned gives off various nerves to supply the parts connected with the *mandibles*, *maxillæ*, and other organs of the mouth.

"The rest of the ventral chain of ganglia forms a continuous series (*fig.* 121, 2, 3, 4, 5, 6, 7, 8,) of nervous centres arranged in pairs, and united to each other by double cords of communication, but they vary much in number and relative magnitude in different families. Those situated in the thorax are usually of the greatest preportionate size, inasmuch as they furnish the nerves that supply the muscles of the wings and legs; the succeeding ganglia give branches to the abdominal segments; and the last, which is commonly of considerable bulk, supplies the sexual organs and the extremity of the colon.

"It is the general opinion of modern physiologists that the intimate composition of the nervous apparatus described above is by no means so simple as it appears to ordinary observation; and, since the experiments of Sir Charles Bell and Majendie demonstrated the existence of distinct columns or tracts in the spinal axis of vertebrate animals, various anatomists have endeavoured to show that corresponding parts may be pointed out in the ventral chain of articulated animals. There can, indeed, be no doubt that this portion of the nervous system of an insect corresponds in every particular with the *medulla spinalis;* and if, in the one case, the nerves which preside over the general muscular movements arise from a different column to that whence the nerves that correspond with the periphery of the body originate, while those which regulate the motions of respiration emanate from a distinct tract, we might reasonably suppose a similar arrangement to exist in the structure of the nervous system we are now examining. It has, in fact, been well ascertained that the nerves given off to the muscular system of the Homogangliata are not derived from the ganglionic masses themselves, but from the cords which connect them together, while the nerves distributed to the integument and external parts of the body communicate immediately with the ganglia. These different modes of origin give presumptive evidence that at least two distinct tracts exist in the central axis of insects; but, from the extreme minuteness of the different parts, it is not easy satisfactorily to demonstrate them separately. In the larger Articulata, however, as for example in the crustaceans, two distinct columns of nervous matter are readily detected: it will, therefore, be more convenient to defer the investigation of this interesting subject until we have an opportunity of describing these parts upon an enlarged scale; enough has been said at present to enable the reader to compare the nervous axis of an insect with that of a lobster, and draw correct conclusions from the comparison."—Pp. 270—273.

On the same subject the following account of the nervous system of the Crustacea may be perused at the same time.

" From a review of the above facts, Milne-Edwards and Audouin arrived at the following conclusions:—1st. That the nervous system of Crustacea consists uniformly of medullary nuclei (ganglions), the normal number of which is the same as that of the segments or rings of the body. 2. That all the modifications encountered, whether at different periods of the development or in different species of the series, depend especially on the more or less complete approximation of these nuclei, and to an arrest of development in some of their number. 3. That approximation takes place from the sides towards the mesian line, as well as in a longitudinal direction.

" In the crab the distribution of the nerves is briefly as follows:—The encephalic mass, or brain, which still occupies its position above the œsophagus, and joins the abdominal centre by two long cords of connection (*fig.* 161), gives off nerves to the eyes and muscles connected with them, as well as to the antennæ and neighbouring parts.

" Near the centre of each division of the nervous collar that surrounds the œsophagus is a ganglionic enlargement from which arises a nerve that runs to the mandibles, and also a very important branch, apparently the representative of the *nervus vagus* of insects. This, after ramifying largely upon the coats of the stomach, joins that of the opposite side ; and, assuming a ganglionic structure, is ultimately lost upon the intestine.

" The nerves of the extremities, derived from the central abdominal ganglion, are represented in the preceding figure (*fig.* 161), which requires no explanation.

" We have already, when describing the nervous system of insects, hinted at the probable existence in the homogangliata of distinct tracts of nervous matter in the composition of the central chain of ganglia, and in the filaments whereby they are connected with each other; reasoning therefore from analogy, it seems fair to presume that, if this be the case, such tracts correspond with the sensitive and motor columns which have been distinctly proved to exist in the spinal axis of vertebrate animals. It is to Mr Newport that we are indebted for the first indication of this interesting fact ; and the accuracy of his observations is readily demonstrable by a careful examination of the ganglionic chain of the lobster and other large crustacean species. Each ganglionic enlargement is, upon close inspection, clearly seen to consist of two portions ; first of a mass of cineritious nervous substance forming the inferior aspect of the ganglion, and of a cord of medullary or fibrous matter which passes over the dorsal or superior aspect, and appears to be distinct from the grey substance over which it passes ; supposing, therefore, the longitudinal chain to consist of anterior and posterior fasciculi, as in the *medulla spinalis*, we have the anterior columns communicating with grey substance, while the posterior are unconnected therewith, but are continued over the ganglion instead of becoming amalgamated with its substance. Another fact, which favours Mr Newport's view of this subject, is derived from an examination of the manner in which the nerves given off from the central axis take their origin ; for some of them undoubtedly proceed from the cineritious portion of the ganglionic swelling, while others, derived from the upper column, not only have no connection with the grey matter, but arise at some distance from the ganglion (*fig.* 138) ; judging, therefore, by the laws at present established in physiology, there seems reason to suppose that the anterior or rather inferior fasciculi are connected with sensation, while the superior constitute the motor tract.

" The reader who is conversant with human physiology will at once perceive that this arrangement is precisely the reverse of that met with in man and other Vertebrata : and this consideration, apparently of little importance, has given rise to a variety of curious speculations ; some anatomists having even gone so far as to assert that all the organs of articulated animals are in reality placed in a similar inverted position."—Pp. 339–341.

These isolated extracts cannot convey any thing like a just idea of the merits of this work. It is entitled to the high character of being the first complete systematic treatise on comparative anatomy published in the English language. It is in all respects executed with great ability, and may be confidently recommended as a standard work in this branch of science.

Besides the merit of being well arranged and presenting clear descriptions of the structure and parts of the organs and classes of organs, this work possesses the advantage of having its descriptive parts most beautifully illustrated by means of excellent engravings. These engravings are done in a style of art to which, in this part of the island, we are as yet strangers. From their being placed in the pages along with the letter-press we infer that they are done on wood; but in accuracy and neatness of outline, delicacy of shading and general beauty, they are superior to most copper-plate engravings. They are quite similar to those by which the work of Mr Yarrell on the British Birds is illustrated; and appearing as they do, in the present volume, they form a new era in the illustrative department of the natural sciences.

The peculiar merit of the volume of Mr Jones, however, is, that it forms an excellent manual and guide to the student, and as such ought to be on the table of every one engaged in the study of the physiological sciences.

The knowledge of comparative anatomy is a most important adjunct to the successful study of physiology; and, without a competent knowledge of it, many of the facts in pathology are not intelligible. Hitherto, however, the want of a good compendious manual was a great and serious impediment to the progress of the student. This deficiency the present work is, in our opinion, well calculated to supply; and it may be further said, that, by promoting the means of obtaining information on a most important and interesting division of the organized world, it will doubtless create and foster, and diffuse the taste for pursuits of this kind.

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## ART. II.—*A Practical Treatise on the Diseases of the Liver and Biliary Passages.* By WILLIAM THOMSON, M. D. Fellow of the Royal Colleges of Physicians and Surgeons, and one of the Physicians to the Royal Infirmary of Edinburgh. Edinburgh. 1841, 8vo. Pp. 306.

ON the diseases of the Liver and on those ascribed to derangement in its functions and structure, many works and essays of different degrees of merit have been written; and unquestionably much has been done to elucidate the etiology and origin of these diseases, and to investigate their effects, and establish a steady and efficient method of treatment. Yet there is scarcely an organ in the human body on the diseases of which we possess a smaller amount of precise information, or in the treatment of the diseases ascribed to which, so much random and empirical practice prevails, we may say, among all classes of practitioners.

It is unnecessary here to inquire into the causes of this state of our knowledge of the diseased conditions of the liver. It is enough to know that such is the fact; and of this, we believe, no experienced physician, moderately well acquainted with the usual works on this subject, or with the practice commonly pursued in this class of diseases, can entertain any reasonable doubt.

The present work we regard as remarkably well calculated to remove several of the objections and difficulties now referred to. It is distinguished throughout by a much greater degree of precision in the pathological history of the different morbid states of the liver, than any work hitherto published on that subject. It contains not only the most ample and complete account of the various dynamic disorders and organic changes incident to the organ hitherto given, but these states are described and distinguished in a much clearer and more methodical manner than in any other treatise yet before the public. In accordance with this, we observe also in the therapeutic principles and precepts established by the author a much more rational development and application of therapeutic measures than it has yet been our fortune to witness. If pathological investigation and distinction be good for any thing, it is chiefly to enable the practitioner to form a rational, clear, and efficient system of therapeutic precepts. Almost universally, nevertheless, in speaking of the treatment of diseases of the liver, this principle has been discarded; and the unanswerable argument of what has been called practical experience has been confidently and authoritatively brought forward to remove all doubts, and to silence all opposition as to the applicability of certain modes of treatment and certain remedies. It has not, however, been so frequently remembered as it ought to have been, that this practical experience, especially in the treatment of hepatic diseases, has often been a species of blind and rash empiricism; that its inconsistency was often the smallest of its faults; and that, if the pathological notions on this tribe of diseases were loose and indefinite, meagre, and inconsistent, or positively and absolutely wanting, the therapeutical principles were vague, unsettled, and without any basis whatever, and certainly without any relation to such pathological ideas as were entertained and usually inculcated.

It is doubtless true that various attempts have been made during the last fifteen or twenty years by different writers, to render the pathology and diagnosis of diseases of the liver more accurate than heretofore, and to fix the treatment upon more rational and intelligible grounds. Nor have these exertions been altogether void of result. But still there is prevalent, it is manifest, on this subject much error much uncertainty, and confusion; and it is scarcely possible to imagine a greater service than to rectify mistakes, and remove misconceptions on the points connected with the pathology and treatment of the diseases of the liver.

This subject is beset with another evil of no light influence, and which contributes daily to confuse and obscure all rational principles of treatment, as well as to perplex and darken the path of observation. It is with many practitioners, of no mean name, a fashion, as it were, to ascribe sundry, we might say many, complaints, but we are averse to exaggeration, to some disorder of the liver, sometimes in secretion, sometimes in some other of its processes, not uncommonly to some unintelligible or inexplicable state of the organ. Thus, if a man has a bad appetite, or does not eat so actively as he used to do, and has a bad taste in the mouth, with a dingy complexion and puffiness in breathing, the doctor looks at the white of the eyes, and presses the right hypochondriac region, and declares the liver to be out of order, and to require some score or two of grains of calomel, or a course of blue pills,—in order, as it is said, to put him to rights. Again, if a person formerly distinguished for the activity with which he operated with knife and fork, and with a reasonably large belly, began to manifest symptoms of apathy at feeding time, he was forthwith pronounced to be bilious, possibly to have a torpid liver, and to require the administration of medicines, denominated antibilious, and conceived capable of restoring the liver to its former activity. Many cutaneous inflammations and eruptions are habitually ascribed to disorder of the liver,—probably congestion or imperfect or deranged secretion. Even varieties of cough are not unusually ascribed to disorder in the liver, and are recommended to be treated by medicines supposed to act on the gland. We must observe here, that we do not deny the existence of what is called hepatic cough. We speak solely of the fact, that it is often assumed to exist. We cannot help thinking, however, that the diagnostic inference is often made without good reason; and we think many observers, who like to have a little more than fancy for the evidence of any given symptom or disorder depending upon the disorder of this organ, will admit that the diagnostic symptoms are often lamentably meagre, and imperfect.

Even in the long-reputed and generally allowed influence of disorder of the liver, in inducing hypochondriacal symptoms, we think there is a degree of looseness, vagueness, and want of precision, very uncomfortable to one who wishes to practise medicine rationally. It is certainly remarkable, and has been observed by many physiologists, that derangements in the hepatic circulation and secretion are often attended with despondency, gloomy mental images, and melancholy hallucinations. But are the same evils and the same mental despondency not observed to be associated with disorder of other organs? Do we not find the liver very seriously diseased, without giving rise to hypochondriacal symptoms; and do we not find these symptoms developed in a very intense degree when there is no proof of disorder in the liver or in its secretion? It is not a matter of doubt in what manner physicians, who are in the habit of observing the phenomena of disease, their concatenation, and their succession, would answer these questions.

Many of the complaints ascribed to disorder of the liver are truly dependent originally on disorder of the stomach, duodenum, and intestinal canal. Sometimes mere constipation, become habitual, is ascribed to disorder of the liver; and we have seen the symptoms produced by worms treated as if they depended on disorder in the liver. In short, there is no subject in which so much confusion and vagueness prevail; and in none is it so requisite to observe precision, to exclude all mere speculation and fancy, and to admit inferences on the ground of correct observation alone.

One of the most prominent and valuable characteristics of the present work is the circumstance of a great degree of precision and accuracy in the pathological history of the several disorders and diseases of the liver. While the author has been most anxious to furnish an ample and complete history of all the diseases, dynamic and organic, incident to the gland, he has been careful to distinguish them accurately, and in their description to give the most essential characters only. He has further evinced a most proper degree of rational scepticism on many reputed and sometimes apocryphal diseased states of the liver; he has carefully considered the force of the evidence, on the strength of which their existence is admitted; and he has shown to what extent the evidence is adequate to sustain the validity of the conclusions. This we regard as the proper mode for the pathologist to fulfil his duty; and we are certain that, if the example set by Dr Thomson in the present work were more generally followed by pathological writers, their labours would be much more useful to the practitioner than they usually are. It is not so much the amount and variety of information as the amount of exact and precise information, that renders a work useful. And next to the mere communication of knowledge, must be placed the power of teaching to distinguish between the certain and the uncertain, the precise and the vague, the correct and the erroneous, and placing the reader in the way of inquiring for himself.

Another important characteristic of the present work, which we think will render it particularly acceptable to the practitioner, is, that the therapeutic department is written in a spirit of rational and eclectic empiricism, which is absolutely requisite in the management of such disorders as those of the liver. The author shows what correct observation and unquestionable facts have been ascertained regarding the curative influence of remedial agents, and considers the applicability of each neither from preconceived opinions, nor the confident assumptions of self-constituted experience, but from the collected testimony of those who have most carefully observed the effects of each.

The materials of the present volume appeared first in the Library of Practical Medicine, as an article on the Diseases, Dynamic and Organic, of the Liver; and it is now published in a separate form, with all those amendments and improvements which the subsequent knowledge, experience, and reflection of the author have enabled him to introduce.

The work in its present shape consists of four chapters; the first devoted to the consideration of the changes in function and structure to which the biliary organs are liable; the second to the examination of the causes producing diseases of the biliary organs; the third to the history of the symptoms and diagnosis of diseases of the biliary organs; and the fourth to the methods of treatment required for the removal or alleviation of these diseases. Each chapter is divided into several sections and subsections, according to the complexity of the subject treated, and the multiplicity of the details requisite to illustrate it.

In the first chapter, Dr Thomson gives a complete view of all the disorders and diseases of the biliary organs under four general sections in the following order:—1. Dynamic or Functional Derangement; 2. Derangements in the circulation through the biliary organs; 3. Organic or Structural Alterations, including inflammation and its effects, and the various morbid products, analogous and heterologous, incident to the biliary organs; and 4. Injuries of the biliary organs.

After some general observations on morbid biliary secretion, Dr Thomson distinguishes the derangements in this process into diminished biliary secretion, excessive biliary secretion, and vitiated biliary secretion. Under the last head is given a view of the results of the inquiries of Demarcay. Dr Thomson remarks that the only general result deducible from all the chemical examinations of this fluid hitherto made, is, that it consists of two classes of constituents; 1*st*, those which are met with only in itself, and on which its peculiar qualities mainly depend; and 2*d*, those which are common to it and other animal fluids. Though under the second he arranges water with various salts of soda, and some other saline ingredients, and a small proportion of mucus, and albumen, he thinks that the diversified opinions entertained by chemists show that it is difficult to say which are the substances to be referred to the first head. This difficulty is chiefly occasioned by the circumstance, that several of the principles which have been described as characteristic of bile are manifestly the product of reaction by various chemical agents.

The most usual changes in this fluid are, 1*st*, its being of an unusually dark colour, generally at the same time more viscid and consistent than usual; 2*d*, its being lighter-coloured or paler than usual, which in some cases depends on its being either mucus or albumen; and 3*d*, on its containing particles of solid matter of more or less consistence, and of larger or smaller size, and which appear to be the commencement of that state which terminates in, or is favourable to, the formation of biliary concretions.

In the second section, on derangements in the circulation through the biliary organs, the author gives a correct view of the present state of our knowledge, on the different forms of congestion of the liver; that state of its vessels in which blood is extravasated either into the *pori biliarii*, or the substance of the liver, or into the cavity of the peritoneum; hemorrhagic softening of the liver; and anæmia.

The third section is more ample, and embraces the consideration of several important morbid conditions. The subject is the structural changes, first, of the liver, and, secondly, of the biliary passages.

Under the first division is given an account of the inflammatory diseases of the liver, and their consequences and terminations, viz. effusion of serum, or of lymph, suppuration of different kinds, and the various outlets by which matter may be evacuated; *cicatrices*, ulceration, gangrene and diminished size. Then under the same head are located successively, adipose degeneration, granular degeneration, or cirrhosis, tubercles, cystic degenerations, and lastly, malignant degenerations. Perhaps it might have been expedient to have drawn a broader line of distinction between the mere inflammatory disorders, and the transformations or degenerations, and to have placed these latter in a distinct subsection by themselves.

Inflammation of the liver is ably though shortly described; and the author then considers the usual consequences or effects of inflammation, under the heads of hepatic abscess, and its modes of termination, cicatrices, ulceration, and gangrene of the liver.

The latter seems to be a rare occurrence; and it is often difficult to establish the evidence of the lesion. Besides two instances seen by Mr Henry Marshall, and recorded in this Journal, Vol. viii. p. 561, and one by M. Andral, Dr Thomson mentions one from the collection of pathological delineations, in his own possession, in the person of a determined suicide.

Dr Thomson adverts shortly to the opinion held by Dr Graves, that it is doubtful that gangrene ever occurs as the effect of inflammation of the liver, but that it may be the result of hepatic apoplexy, or hepatic parenchymatous hemorrhage ; and adheres, though not very confidently, to the opinion, that a gangrenous or gangrenoid affection may be the result of inflammation of the liver, as in the lungs and other organs.

The truth is, that this notion of gangrene being seldom if ever the result of inflammation, and being very often, most frequently, we think it is said, the result of hemorrhage, or, as it is now called apoplexy of the lungs, of the liver, and other organs, appears to be one of the favourite pathological fancies of several physicians of the Dublin school. It would not be becoming in us to assert, in opposition to what is allowed to be good authority, that gangrene may not be the result of hemorrhagic effusion as well as of inflammatory effusion. But, with deference to Dr Graves, we beg to submit the following facts and questions for their consideration.

In the *first* place, What causes the effusion of blood ; and by what pathological state of the texture is it preceded ? Is *not* effusion of blood, in such organs as the lungs or the liver, often preceded by a state quite similar to, if not the same as, inflammation ? Does inflammatory congestion not frequently terminate in the effusion of blood in the cellular membrane and parenchymatous organs, in the mucous membranes, and in glands, as in the prostate gland ?

*Secondly*, The opinion entertained by several of these gentlemen is, that the blood when effused undergoes decomposition. But the question previously to be determined is, why should the blood undergo decomposition in this case any more than in any other ? It is known that blood is often effused in various textures, and in the interstices of various organs in the animal body, and that, nevertheless, it does not always, nay, not even in a majority of cases, undergo decomposition. We see, for example, blood effused within the pleura and within the peritoneum, and, nevertheless, not undergoing decomposition.

*Thirdly*, Is it not the fact that, when hemorrhage takes place along with gangrene, it is rather the effect of the preceding gangrenous state than the cause of the gangrene which is erroneously supposed to follow it ? We know that in many gangrenous or septic diseases, hemorrhage takes place as a consequence of the previous softening of the textures, or softening, we must add, which seems to be the result of previous inflammation, whether that be of a common or a specific nature. The course of phenomena, or rather of the process, seems, in general, to be as follows in such cases. *First*, inflammatory action or vascular congestion distends and overloads the vessels of the part, and causes also interstitial extravasation or effusion of blood, of lymph, and of serum. *Secondly*, by this the pliancy and elasticity of the texture is destroyed ; it becomes friable, lacerable, and easily softened ; its physical properties are altered and impaired ; and its vital properties are enfeebled. *Thirdly*, as the action continues, the texture of the part is still more completely changed from its normal or healthy state; and, at length, in any slight increase in the morbid distension, the parts, already deprived of much of their vital properties, give way; vessels are broken open and expose their contents; and parts lose their cohesion; and the process of gangrene, which is very much a mechanical one, is established.

If this take place in the lungs, we infer that it may equally take place in the liver; and hence we confess our inability either to perceive that gangrene is the effect of hemorrhage, or to admit that it is rarely the result of inflammation. The latter we believe to be its most common cause; and without denying the occasional influence of hemorrhage in the production of the lesion, we must, with respectful deference to others, retain the sentiment that the hemorrhage is more frequently the effect than the cause of the gangrene.

The Degenerations next attract attention.

In considering the nature of granular degeneration, Dr Thomson takes a view of the opinions of Baillie, Laennec, Boulland, Andral, Cruveilhier, and the late Dr Hope; and arrives at the conclusion, that "its determination appears to require a more minute species of investigation by injection, dissection, and microscopic examination in the successive stages and different aspects of granular degeneration, than, with all the labour bestowed on the subject, it seems yet to have received."

After this inference, which appears to be founded not only on a careful examination of the inquiries of his predecessors, but also on frequent personal examination of specimens of the diseased structure in question, it may be impertinent as well as superfluous to offer any additional observation. We think, nevertheless, that the opinion of Boulland makes the nearest approach to the truth. It has long appeared to ourselves, when examining this form of diseased liver, that it consists principally in a morbid enlargement of the *acini*, granules, or minute component glandular grains, of which the liver is composed, accompanied, however, with a considerable change in their intimate structure,—most probably of the nature of induration, in consequence of chronic inflammation; and that, as these *acini* thus become enlarged and firmer than usual, they encroach upon the other textures, especially the cellular texture of the liver, and first condense it, rendering it more distinct, and then cause it to disappear or be absorbed.

In speaking of the cystic degeneration, the author properly distinguishes between mere serous cysts and the hydatid or entozoon, which assumes that appearance.

Under the general name of malignant degenerations, Dr Thomson includes scirrhous or carcinomatous growths, encephaloid, hæmatoid, and melanotic tumours. These, he observes, are seldom confined to this gland, but when they appear in it, appear also in other textures. Of all these, perhaps, the encephaloid is the most commonly found in the liver. The truth of the following observations we have had repeated occasion to verify.

"124. Of very many cases of malignant degeneration of the liver," says Dr Thomson, "which have fallen under our own observation, a considerable number has occurred in females, who had undergone at different periods before death, amputation of the mamma; a considerable number has been individuals who laboured under malignant affection of the stomach; several in persons whose death was primarily attributable to cancerous obstruction of the intestinal canal; and several, also, in persons in whom extirpation of the eyeball had been practised, on account of malignant disease of that organ."—*P.* 55.

The observations on the characters and effects of these tumours are given very shortly, but with great precision and judgment. We can only make room for the following remarks, with which the section is concluded.

"134. Cancerous tumours in the liver are sometimes so seated as to compress more or fewer of its several classes of vessels, sanguiferous or biliferous. M. Cruveilhier thinks that some cases of partial atrophy of the liver accompanying this morbid degeneration, may be attributed to the compression of the secondary arterial and venous branches; and that some cases in which the organ has undergone general atrophy, may have depended on compression of the large vascular trunks. It is probable that the compression which these masses exert on the venous system contributes, at least, to the production of the ascites and anasarca which attend this disease, particularly in its advanced stages; and it seems well ascertained, that the jaundice which so frequently occurs in this form of disease, *is* the consequence of the compression of the larger excretory gall-ducts. M. Cruveilhier affirms that he has never observed cancer of the liver accompanied with jaundice, without finding it to depend on a compression of this kind."—P. 60.

Under the second division are treated all the lesions affecting the biliary passages, including not only changes in the texture of the gall-bladder and gall-ducts, but such symptoms as result from the presence of gall-stones and of parasitical animals.

The first subject considered under this head is the presence of gall-stones in the tubuli, the ducts, or the gall-bladder. The great size which several of these bodies attain, and the several modes in which they may escape or be discharged, are the principal topics which here demand consideration. When of unusually large size they are discharged either by the intestinal canal, the whole of which, as well as the cystic and common ducts, they must of necessity traverse; or they procure for themselves a route to the surface of the body by means of ulceration, most commonly through the parietes of the intestinal canal and abdominal muscles. Thus very curious examples of the latter mode of issue are recorded as having occurred in the experience of Tolet,[*] Hoffmann,[†] Cheselden,[‡] Haller,[§] Bloch,[||] Buettner,[¶] and others; and many years ago Mr George Whyte, a judicious practitioner in this city, informed the author of this article that, in a patient of his, a large gall-stone was discharged by an abscess in the abdominal parietes. There are preserved in the Museum of Guy's Hospital two biliary calculi, which made their escape by an abscess at the navel in a female patient of M. T. Callaway, one of the surgeons to that hospital. (1987 in Catalogue.)

This ulcerative process, however, Dr Thomson has properly noticed, may be incomplete or partial, that is, it may affect merely the biliary passages without touching the intestinal tunics, or the abdominal parietes; or it may affect both the biliary passages and the intestinal tunics, but not complete the process by affecting the abdominal peritonaeum and muscles. In the first case there are evidences, in the ravages caused in the gall-bladder or gall-ducts, that inflammation had been induced and caused ulceration and adhesion. Thus Soemmering tells us that he preserved a gall-bladder filled with gall-stones, and which was on the point of allowing these calculi to escape by an ulcer in its fundus; and Dr Thomson adduces various examples of similar forms of ulceration, different, however, in degree. We may also mention, that Mr George Mallet, relates in the ninth volume of the Transactions of the Provincial Medical Association, recently published, a case in which, after long suffering, acute pains, yet without jaundice, death took place, and inspection disclosed an ulcerated opening through the coats of the gall-bladder, communicating with an abscess beneath the concave surface of the liver, containing about six ounces of matter, and a moderate sized gall-stone near the opening, but still within the gall-bladder,—and another gall-stone about three-fourths of an inch in diameter imbedded in a cyst in the substance of the pancreas. (P. 467.)

In the second case, these evidences may remain more or less distinctly; or if the calculus have come through the duct, they may be imperceptible. But, in addition to these, there are also evidences of intestinal inflammation and ulceration. Of this peculiarity, also, there is preserved at the museum of Guy's Hospital a very good instance, one, namely, in which a biliary calculus was lodged in the ileum, where it caused fatal inflammation; (Enteritis.) (No. 1986.) It is not likely that in such cases the concretion could have passed through the ducts without causing ulceration there also.

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[*] A gall-stone as large as a pigeon's egg from an ulcer at the navel. Traité de la Lithotomie, 8vo. 4trieme edition. A Utrecht, 1693. Chap. iv. p. 24.

[†] Eighty gall-stones from an ulcer in the abdomen.

[‡] Two gall-stones six lines in diameter through the abdominal integuments. Anatomy, Book iii. chap. v. p. 166. Edit. 12th, 1784.

[§] An ulcer in the epigastric region, furnishing from time to time angular three-sided gall-stones. Opuscula Pathologica, Obs. xxxviii. Historia viii. Op. Minora, iii.

[||] From an ulcer under the false ribs. Medicinische Bemerkungen. Berlin, 1774.

[¶] Thirty-eight gall-stones discharged by the navel. Funf Besondere Wahrnehmungen. Koenigsberg, 1774.

It is most common for biliary calculi to be discharged by either of the two modes now mentioned; and not very usual for them to be expelled from the stomach by vomiting. Yet Schurig, one of the original systematic writers on concretions, mentions not fewer than eight cases in which gall-stones had been expelled by vomiting.*

The subject of inflammation of the gall-bladder and ducts, ulceration and perforation, is afterwards considered in reference to the presence of gall-stones. 152—156.

Enlargement of the gall-bladder and of the ducts often takes place in consequence of an impediment or obstacle at the neck of the former, or in the course of the latter; and the extent to which the gall-bladder and ducts may in such cases be distended is very great. The gall-bladder is distended in such circumstances, not always with bile, but with bile much mixed with mucus, or with an albumino-gelatinous semifluid matter. The ducts have been seen enlarged almost to the size of an intestinal fold.

The fourth section is devoted to the subject of injuries of the biliary organs, including laceration or rupture of the liver, wounds of the liver, rupture of the gall-bladder and gall-ducts, and wounds of the gall-bladder and gall-ducts.

Rupture or laceration of the liver is almost uniformly the effects of falls from a considerable height, in which the whole of the body and its organs receive a violent shock,—or of heavy bodies passing directly over the region of the liver, or of violent blows inflicted on the region. In the whole of these cases, when laceration is induced, hemorrhage, more or less copious, sometimes to a very great amount, takes place within the cavity of the peritonæum.

This accident is occasionally accompanied with rupture of the gall-bladder and biliary ducts, in which case the escape of bile into the cavity of the peritonæum induces almost invariably and necessarily fatal peritonitis, generally with *tympanites peritonealis*, the variety called *Stewartii* by Sauvages. Dr Thomson, however, shows that the case recorded by Mr Fryer of Stamford, in which there was every reason to believe this accident had occurred, and in which a fluid-like bile was evacuated by paracentesis, with eventual recovery of the patient, indicates that the accident is not necessarily fatal.

A curious case of rupture or laceration of the liver, with forcible detachment of the gall-bladder from the gland, is recorded in the fifty-fifth volume of this Journal, (p. 353.) It is an unfortunate omission, however, in this history, that it is not stated whether the gall-bladder or the ducts were torn or not, so as to admit of the effusion of bile. Much blood was effused; and the patient seems to have died, partly from hemorrhage, partly from peritonæal inflammation.

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* Lithologia.

The article is concluded with some remarks on the cause of death in the kind of injuries now mentioned. Dr Thomson thinks that when the fatal event occurs speedily, it is the result of the shock; and when more slowly and at a later period, it is the consequence of peritoneal inflammation ensuing on the effusion of bile into the peritonæal cavity.

The second chapter of the work is devoted to the investigation of the causes capable, or believed to be capable, of producing Diseases of the Liver. These the author, discarding the old division into predisposing and exciting causes, as not well calculated for giving a clear and correct view of the etiology, distinguishes in the following manner; 1*st*, External morbific powers, as climate, epidemic prevalence, influence of diet and exercise, injuries, the use of alcoholic liquors, the use of mercury, and the operation of mental emotions; 2*d*, The reciprocal influence of diseases of the biliary organs in producing one another; and 3*dly*, The influence of diseases of other organs in producing those of the liver and biliary passages.

Under the first head Dr Thomson is disposed to consider the degree of atmospheric heat as the great determining cause of hepatic diseases; and he infers from the observations which have now increased to a great number, made in different regions of the globe, that the frequency and the fatality of these diseases in different countries is in proportion to their annual range of temperature.

To establish the justice of this conclusion, Dr Thomson takes a view of the facts which have been ascertained as to the prevalence and mortality of hepatitis and other hepatic disorders in the several tropical countries under the British colonial government by Mr H. Marshall, Mr Annesley, Dr Mouat, and especially those given in the Statistical Reports by Mr Marshall and Major Tulloch. The general result of the whole may be stated in the following manner.

High atmospheric temperature alone does not appear always capable of explaining the prevalence and fatality of hepatic disorders. Madras appears to be a station at which this tribe of disorders is more prevalent than at the other two, Bengal and Bombay, in the proportion of 10 to 6, and most fatal in the proportion of but 6 to 4, or of 3 to 2.

Great dryness with high temperature appears to be more favourable to the development of hepatic disorders than mere high temperature with humidity. But wherever the high temperature of the day is accompanied and alternated with a very low temperature during the night, affections of the liver, first dynamic and then organic, seem to be very readily brought into action. It is possible that telluric miasmata may operate very powerfully and perniciously during the latter period of the nycthemeral space.

In our Indian possessions Europeans suffer most severely by hepatic inflammation, and hepatic disorders in general. The natives are much less frequently attacked; but when attacked they are less able to resist the ravages of the disease. Hepatic disorders, in other words, are more prevalent among Europeans in India than among the Hindoos and other native tribes; but they are less fatal among Europeans than among the natives. The mortality in the West Indies from hepatic disorders is smaller among the black than among the European forces. But in the Mauritius the mortality from this class of disorders is greater among the black troops than among the Europeans. For this peculiarity in the climate of the Mauritius, no satisfactory reason has been yet assigned.

Another view, however, remains to be taken of high temperature in the etiology of this disease. We have already spoken of telluric miasmata as an energetic and efficient cause in the production of hepatitis. Is it not probable that we should consider hepatitis and various hepatic disorders as the offspring in common with remittent fever or endemial fever of the same cause or causes from which the latter arises? It is well known that in miasmatic districts, as the Carolinas, Louisiana in America, the Maremma in Italy, and the Maritime Alps in France, where agues and remittent fevers are endemial, enlargement of the liver, induration of the liver, and various chronic affections of that gland are very prevalent; and even in various situations of these miasmatic districts, persons who have never had any distinct attack of ague, present, nevertheless, various forms and degrees of hepatic disorder, sometimes with, sometimes without ascites.

All these facts, we think, justify the inference that, under the same physical causes which produce ague and endemic fever, disorders of the liver may also arise. It matters not much what be the exact mode in which these disorders take place. It is sufficient, it appears to us, that proof of their existence and of their formation under the circumstances now mentioned is afforded.

It may indeed, in opposition to the idea that these disorders of the liver are the pure and isolated effects of elevated temperature, be argued that they are the effects of telluric miasmata. This cannot be denied. But it must be again answered, that it is difficult, if not impossible, to separate the effects of mere elevated temperature from those of telluric emanations alone, and the effects of the latter alone from those of the former. It is well ascertained that the latter are inefficient without the aid of elevated temperature; and if this be admitted, how difficult must it be to trace morbific effects to either of these two agents separately.

For all these reasons, we suspect that, in investigating the etiology of hepatic diseases, we must look not to the simple circumstance of elevated temperature alone, when we consider the influence of that agent, but to the influence of elevated temperature in engendering miasmata, and in giving force and energy to their operation upon the human frame. This appears to approach to the explanation of the difficulty suggested by Dr Mouat, that the prevalence of hepatic disorders in Bengalore cannot be explained by mere elevated temperature alone.

The justice of these observations may be said to be fully confirmed by the facts which are adduced by Dr Thomson, under the head of the third section, in reference to the occurrence of diseases of the liver, after or along with fevers of intermittent or remittent type. To this point we may afterwards have occasion to direct the attention of our readers. But we may here observe, that, whether we view the febrile disorder as giving rise to the disease of the liver, or not, it is scarcely possible to doubt that the same general causes which produce these fevers, must be efficient in producing also various disorders of the liver; and it seems rather to be a difference in the degree than in the kind of the causing agents, to which we are to ascribe the differences in the nature and amount of the morbid action.

On the influence of spirituous liquors, the evidence adduced is rather ambiguous. It seems, indeed, doubtful whether the habitual or excessive use of these stimulants has any specific effect upon the liver, or affects the circulation and secretion of that organ more than they do the circulation of other organs, and the circulation and secretion of other glands. The evidence adduced goes no farther than to show, that the use of spirituous liquors, by acting on the stomach and alimentary canal, may disorder the circulation of the liver, and, by impairing the general health, may make that gland more liable, than under other circumstances, to the operation of various causes of disease, as climate, telluric miasmata, and similar agents. So far as we have enjoyed opportunities of observing on this subject, we have remarked that, in the bodies of those who had long been accustomed to the habitual use of spirituous liquors, the duodenal mucous membrane was always much firmer, and more granular and friable than natural, and not unusually the substance of the liver was hard, firm, and friable, less loaded with blood than usual, and in the advanced stages paler and lighter coloured than natural.

In conclusion upon this topic, we would say, in addition to what is stated in the volume before us, that the effect of the use of spirituous liquors is to induce not acute inflammatory disorders of the liver, but several states of chronic congestion, often with induration, and eventually an anaemial condition of the gland. It appears to be for this reason, that, if we seek the explanation of acute diseases of the gland, in the use of spirituous liquors, we shall not find it there. But, on the other hand, we find several chronic morbid conditions attributable to this cause.

The use of mercury is a cause of various disorders of the liver by no means unimportant. The employment of this mineral has been observed by many authors to be followed by the production of symptoms of hepatitis, and sometimes by the occurrence of hepatic abscess. Dr Thomson has adduced, from observers of good authority, various pointed facts, showing that the use of mercury was manifestly followed by symptoms of different diseases of the liver.

Admitting, therefore, the fact, he is led to inquire in what manner such agents as alcohol and mercury, when introduced into the system, may be supposed to act; and the conclusions at which he arrives may be understood from the following extract.

"220. These facts would seem to imply that foreign matter, circulating along with the blood, are peculiarly liable to be detained in this depuratory viscus; and they suggest the inquiry whether any thing analogous can be supposed to happen in respect of alcohol and mercury, when these substances exert a noxious influence upon the liver. MM. Autenrieth and Zeller state, as the results of some experiments which they made on the effects of mercurial frictions upon animals, that mercury was found in the bile of animals which had been killed by the use of this metal, and in a quantity proportionally much greater than even in the blood of these same animals. They noticed, also, an alteration in the colour of the bile in dogs thus treated, inasmuch as it was green in place of being yellow, as it usually is. This change in the physical properties of the bile they are disposed to attribute rather to the presence of the metal in it, than to an alteration of the secretion. (Reil's Arch. viii. 252.) In some ingenious experiments performed by M. Cruveilhier, it was found, that when mercury was introduced into the abdominal venous circulation, it was for the most part arrested and deposited in the liver, giving rise in that organ to inflammatory action; and that, on the other hand, when introduced into the general venous circulation, it was usually arrested in the lungs. These results, however, M. Cruveilhier acknowledges not to have been uniform; the mercury in these experiments, like the pus absorbed from abscesses, being sometimes deposited in other organs or parts of the body than the liver and lungs; in consequence, as he conceives, of the foreign substance having escaped in part, or in whole, through its first barrier, and finally been stopped in some other situation. Dr Percy, in his recent 'Experimental Inquiry concerning the presence of alcohol inthe ventricles of the brain, after poisoning by that liquid,' states, as his third conclusion, that 'alcohol may be detected in the blood, the urine, the bile, and the liver. It may be separated with great facility from the bile and liver; and this circumstance,' he conceives, 'may probably serve to explain the frequency of hepatic disease in habitual drunkards.' M. Andral, it may be remarked, had previously suggested that the alcoholic particles introduced into the alimentary canal, being carried directly to the liver by the mesaraic veins, may act as a direct irritant upon that organ.

"221. Whatever may be thought of the validity of M. Cruveilhier's views of the liver and lungs as barriers to the circulation, or of the applicability of these views to the explanation of the production of liver-disease by substances introduced into the alimentary canal, it seems probable that, in many cases, alcoholic liquors exert their first morbific effect on the mucous membrane of the canal; and that the morbid affection of this membrane, to whatever it may amount, extends, by continuity of texture, to the mucous membrane of the gall-ducts, and from thence to the parenchyma of the liver. 'In the dissection of those who have been intemperate dram-drinkers,' says Dr Saunders, 'the diseased structure may be traced from the stomach along the course of the *ductus communis*, and I have frequently seen these ducts so contracted and thickened (in such persons), that they could not transmit bile;' and Mr Twining, in mentioning obliteration of the biliary ducts as being only observed when the liver had undergone certain forms of enlargement, adds, 'the patients for the most part are drunkards.'"—Pp. 103–104.

The question as to the influence of mental emotions is one of great extent and importance, but unfortunately very vague, and liable to be made the subject of much loose speculation. This Dr Thomson admits; and while he allows that the general fact of influence is undeniable, he observes that it is extremely difficult, if not impossible, to determine in those cases in which symptoms of biliary disorder take place, "whether it is the secretion or the excretion of the bile that is disturbed." We know from the fact of jaundice taking place after loathing, after various transactions that are disagreeable, or cause disgust or even horror, that there must be some influence exerted either on the secretion or the excretion of the biliary fluid. But, as Dr Thomson has observed, the mechanism of this operation is totally unknown; the chain which connects the antecedent and the subsequent event is concealed from our view.

In various mental emotions of a gloomy or depressing character, we think that there is quite as much reason to believe that the hurtful operation of these agents acts on the stomach, duodenum, and jejunum, but particularly on the circulation and secretions of the stomach, as on those of the liver; for the loss of appetite, the dry tongue, and the thirst attendant on several of the anxious or depressing emotions, manifestly indicate the presence of gastric disturbance. This circumstance, we conceive, constitutes a considerable source of fallacy in making any observations on the alleged operation of these passions, and also, we add, in drawing any conclusions from such observations. We would refer on this subject to various passages in the Dissertation of Dr William Falconer on the Passions, to some ingenious observations of Bichat in his Treatise *Sur la Vie et la Mort*, and to many passages in the sketches from the Case-Book of Mr R. Fletcher, reviewed in this Journal, Vol. xl. p. 462.

On the second general division, under this head, viz. the reciprocal influence of diseases of the biliary organs in producing one another, Dr Thomson makes very few remarks; and, indeed, the operation of these causes is so obvious, that it does not require many. He chiefly directs attention to the circumstance, that any morbid condition, whether seated in the substance of the liver, or in the gall-ducts, which tends to impede the flow of bile, will, among other circumstances, favour the formation of gall-stones; and the existence of gall-stones again favours the formation of jaundice, and other diseases of the liver.

Under the third division of the Etiology, Dr Thomson takes a view of those diseases either of the system at large, or of other organs which are known to produce disease in the liver, either dynamic or organic.

The first of those to which he refers is the tribe of fevers, especially those which assume a remittent or intermittent type, that is to say, endemial fever, or fever from telluric or climatic causes. This is so well known that it is impossible to question the fact. At a very early period it was noticed by Lionel Chalmers, as to South Carolina, afterwards by Jackson, as to North America and Jamaica; and the repeated experience of the Walcheren fever was sufficient to remove all doubt on the subject. Dr Thomson adduces the authority of Dr Davis, who certainly gave the most ample account of the necroscopic appearances in the dead bodies of those who, surviving the immediate attack, were destroyed by the subsequent effects of the disease. We may add, that multiplied evidence to the same effect may be found in Foderé's Statistical Account of the Maritime Alps, Irvine's work on the Diseases of Sicily, and Bailly's Treatise on the Pernicious Fevers of Rome.

This circumstance may be regarded as another proof of hepatic disorders, and ague, and remittent fever, all originating from the same source.

A second class of diseases which may give rise to hepatic maladies, is that of affection of the alimentary canal. And this, it has been very eagerly attempted to be shown by the disciples of the physiological school, is a proof of the power of gastric or duodenal, or gastro-enteric irritation, to engender disease of the liver, first dynamic, and eventually organic. Dr Thomson, without postively and unconditionally denying the doctrine of Broussais and his disciples, that gastro-enteric irritation or inflammation may or must induce hepatic disorder, thinks, nevertheless, it may be carried to an undue length, especially in the propositions, that hepatitis is consecutive to gastro-enteritis, when not dependent on external violence, " and that chronic gastro-enteritis is the cause of hepatic engorgements, and of yellow and fatty livers, even among the phthisical."

The intestinal disease which seems to be most commonly productive of hepatic disease and hepatitis is dysentery; but, as Dr Thomson remarks, it is extremely difficult to say whether, in the coexistence of these two maladies, or even in the sequence of the one on the other, we are to perceive more than mere complication, or, at most, different parts of the same distemper, or two different effects from the same cause.

In the third chapter, which is devoted to the history of the symptoms attending diseases of the biliary organs, and the diagnosis of these diseases, the author gives an ample and detailed account of the several phenomena which are observed to take place in the course of hepatic and biliary diseases, forms a correct estimate of the diagnostic value of each symptom, considers the symptoms by which they may be complicated, obscured, or modified, and from the whole, viewed at different stages of each disease, shows how a just and satisfactory diagnosis may be established. This part of the work is evidently done with great care and precision. It is arranged in a very methodical manner; and, as we are certain that it contains one of the best semiographic histories of hepatic and biliary diseases extant, we recommend its careful perusal and attentive study to those who wish to make themselves familiar with the diagnosis of this tribe of disorders. We do not propose to give any analysis of this part of the work of Dr Thomson; but, to induce our readers to study the work, we insert, on the occurrence of hemorrhage as a symptom in diseases of the liver, the following remarks, which form a clear and useful abstract of all that is known on the subject.

" 392. The same physical impediment to the free passage of the blood in the *vena portarum*, through the parenchyma of the liver, which in one case leads to dropsical, may, in another case, produce hæmorrhagic effusion. But the liver, by its enlargement, may press upon, and cause impediment to the circulation through, venous trunks that form no part of its own constitution. The hæmorrhages that occur in hepatic diseases, therefore, may or may not proceed immediately from the portal system.

" 393. From the earliest periods of medicine, the discharge of blood by the nostrils, or epistaxis, seems to have deen regarded as frequently depending on affections of the liver and the spleen. In more recent times Dr Donald Monro, in his ' Account of the Diseases most frequent in the British Military Hospitals in Germany,' in stating that the jaundice was very frequent, and in a manner epidemical, among the troops, for some time before they left the field, at the end of the campaign of 1760, observes, 'several who had been reduced by fevers or other complaints, before the jaundice appeared, were attacked with violent hæmorrhages from the nose; and two had like to have died of them before the bleeding was stopped. The hæmorrhage did not prove critical, but seemed to depend on a dissolved state of the blood. It commonly stopped soon.' M. Latour relates a case of nasal hæmorrhage occurring in the last stage of jaundice (Hist. &c. des Hæmorrhagies, Obs. 902), and another of fatal issue, which was dependent on obstruction of the liver (Obs. 745); and M. Lombard refers to the case of a young man who had been affected for six weeks with a jaundice that had resisted all the means of treatment employed against it, though it did not appear to be connected with organic disease of the liver, in whom there occurred frequent attacks of epistaxis attended with the loss of a great quantity of blood, in one of which the patient died, nothing being found capable of arresting the hæmorrhage. (Clin. Med. de l'Hop. de Genéve.)

" 394. The hæmorrhage originating in hepatic affection, sometimes take place from the lungs instead of from the nostrils. M. Barthez, in his Nouv. Elem. de la Sci. de L'Homme (ii. 58), makes particular reference to hæmoptysis as being liable to occur as a consequence of obstruction of the liver. He rejects the explanation proposed by some of the older authors, of this species of hæmoptysis being attributable to rupture of the veins of the liver, and conceives that it must be produced by sympathetic correspondence of affection between the veins of the liver and those of the lungs, though of the primordial causes of this sympathy, he acknowledges we are entirely ignorant. There can be little doubt, however, that in most of the cases in which hæmoptysis occurs as a consequence of hepatic affection, it is attributable to the pressure of the liver upwards, diminishing, as has been already shown (381), the amount of pulmonary substance through which the blood sent to the lungs is able to circulate.

" 395. In other instances the discharge of blood dependent on disease of the liver, takes place from the surface of the alimentary canal, whether of the stomach, producing hæmatemesis, or of the intestines, and is probably attributable to distension of the trunk and abdominal branches of the *vena portæ*. (Latour, Obs. 743, 746, and 744.) Dr Law, from having found in a succession of cases of hæmatemesis dependent on disease of the liver, which proved fatal under his own observation, that that organ was in a granular condition, has been led to conceive that this is the only diseased state of the liver which gives rise to vomiting of blood. (Dubl. Med. Trans. i. 105.) This seems, however, to be too hasty a generalization.

" 396. In other instances again, the hæmorrhage may take place simultaneously from the mucous lining of the air passages and of the alimentary canal. Dr Heberden mentions, that in the advanced state of what he calls the inflammatory scirrhi of the liver, 'the blood will gush out in great quantities from the nose, the gums, the stomach, the navel, and with the stools; which is probably,' says he, 'to be attributed to the obstruction which it meets with in the scirrhous liver;' and Mr Langstaff states, that he has noticed that, in most organic affections of the liver, nasal, stomachic, or intestinal hæmorrhages are not unfrequent occurrences, which he supposes may be considered to arise from excessive determination of the blood to the mucous surfaces of those parts, and nature relieving their over-distension by hæmorrhagic profluvia. (Med. Chir. Trans. viii. 292.)

"397. To these statements respecting the connection of hæmorrhage with diseases of the liver, we may add those made by Dr Bright in his remarks on jaundice. That accurate observer states, that, should death occur in jaundice from congestion, it will probably have been preceded by the passage of blood, more or less freely, from the lungs or the intestines; and the examination of the body will demonstrate that the liver has only partaken with other organs in the congested state of the venous system: that in jaundice from organic deposit, at an advanced stage, ecchymosis takes place in various parts, and blood escapes from different surfaces; and that in jaundice from inflammatory action in the liver, the tendency to hæmorrhage sometimes comes on very early, and is excessive. (Guy's Hosp. Rep. i. 605, 9, 14.)"—Pp.178—180.

To the general accuracy of these observations our own experience enables us to bear unequivocal testimony. All these hemorrhages are in general instances of the passive hemorrhage of pathological writers. But the important point to the physician is, that the hemorrhage, whether nasal, gastric, or intestinal, is not itself a disease, but only a symptom of another disease.

Morbid affections of the brain and nervous system are also often observed in the course and towards the close of hepatic and biliary disorders; and of these and their peculiar characters, Dr Thomson has given a full and correct delineation.

In the fourth chapter, which is devoted to the examination of the modes of treatment best adapted for removing the several morbid conditions of the biliary organs, or for diminishing their injurious operation on the economy, the author takes a very extended and elaborate view of the therapeutic measures adapted to each disease, and each stage of disease of these organs. The mode of procedure which he follows in this part of his work may be understood from the following extracts.

"432. In attempting to exhibit a general view of the principles upon which the treatment of the diseases of the biliary organs should be conducted, it will be convenient to consider them under the following heads: 1*st*, Simple functional derangements, including concretionary obstructions; 2*d*, Congestive and inflammatory affections; 3*d*, Organic alterations of a mild or of a malignant character; and, 4*th*, Preternatural collections of fluid."—P. 196.

It may be observed that, both in this general outline of the whole subject, and also in the subsequent detail, the author studies to adapt the curative indications, and the particular means by which they are to be fulfilled, to the pathological nature of each affection. He weighs also with great accuracy the value of the evidence in favour of each mode of practice, and each remedy in obscure and anomalous cases.

Dr Thomson justly attaches great importance, in all affections with inflammatory or febrile symptoms, to the employment of antiphlogistic measures, especially blood-letting, general and topical, the steady use of cathartics, and rigorous adherence to restricted diet. In the early stage of all these disorders, indeed, blood-letting is the great remedy; and so long as pain or distension, or a sense of fulness, is present, it is the remedy on which the practitioner should rely. When general blood-letting seems, from the feebleness of the patient, the absence of symptoms of general disorder, or from previous adequate depletion, to be no longer necessary, still he recommends local bleeding in different forms, and from various regions. Thus the application of leeches to the anus, so as to produce a considerable discharge from the blood-vessels of the rectum,—or of leeches to the hypochondriac region, he recommends to be practised from time to time, until the symptoms of pain are sensibly relieved or disappear. Local blood-letting by cupping, he thinks, like Mr Annesley, likely to aggravate the pain by the forcible pressure of the glasses. There is no doubt that this is a very considerable objection in cases where the pain is acute, and accompanied with tenderness of the surface of the hepatic region; but where the depletion is not forbidden by those reasons, that is, where there is dulness, and weight or fulness without tenderness, or where the pain is dull, the depletion by the cupping-glasses is always a most useful and efficient remedy.

Upon the same principle, purgatives, especially the saline, are strongly recommended; revellents or derivatives or counter-irritants; and, above all, regulated diet.

The eighth indication, viz. to give vent to preternatural collections of fluids, receives a lengthened and careful consideration; and all the reasons for and against puncture, as well as the circumstances under which it should be performed, and the mode of performing it, are deliberately examined.

The reader will find also some curious and instructive observations upon the opening of the distended gall-bladder.

The last division of this chapter is devoted to the examination of the claims and alleged merits of remedies denominated specific, under which head Dr Thomson includes quicksilver and its preparations, nitromuriatic acid, and taraxacum.

Though the first of these agents has been very much employed in the treatment of different kinds and stages of hepatic disease, and, indeed, no medicinal agent has been so frequently or extensively used, yet it is very doubtful whether it has not caused more evil than good, and whether it have not very often aggravated all the symptoms which it was given to relieve, and precipitated the fatal termination of that disorder which it was expected to have cured. It seems now to be very generally admitted that mercurial preparations have been both given too indiscriminately and to too great an extent, and that they have been often given in circumstances in which they ought to have been withheld. Dr Thomson enters into a full and methodical consideration of all the circumstances under which these minerals have been given or recommended, examines atttentively all the facts and arguments by which their use has been advocated, shows the effects actually produced by their use, and has stripped of the delusive dress in which it has been invested, the whole of the doctrine of the universal efficacy of mercury. This part of the work we recommend to the careful perusal of all practitioners. They will find in it much correct and extensive information, a great deal of good reasoning and sound judgment, and a spirit of independent and original thinking, which cannot be too highly estimated.

Dr Thomson questions the efficacy of mercurial preparations, not only in the derangements of secretion, to which the liver is liable, but also in its acute inflammatory disorders, and still more in the several forms of chronic disease.

"617. In multiplying, as we have done, our quotations relative to the prejudicial operation of mercury in the chronic and structural diseases of the liver, we are influenced by the apprehension that, numerous and eminent as are the authorities from which these warnings against its use, in this class of cases, have proceeded, they are too frequently neglected in practice; partly in consequence of vague notions entertained by many medical men of mercury being a *panacea* in hepatic diseases; partly from want of reflection on the great variety that exists in the diseases to which the liver is subject; partly from the difficulty experienced in distinguishing them from one another when a diagnosis is attempted; and partly, perhaps, also, from compliance with popular opinion."—P. 283, 284.

We have ourselves seen not a few instances of the pernicious effects of the administration of mercury, both in acute and chronic forms of hepatic disease; and all that we have seen only convinces us the more strongly that it is a most unsafe and detrimental agent, and that there are almost no cases in which it ought to be given so as to affect the system.

To the nitro-muriatic acid he is more favourable; and, indeed, that is an agent which, if it do no good, is not likely to do harm.

Our limits will not allow us to enter more fully into the contents of this volume; but we recommend it very strongly to the attention of the reader, as one capable not only of giving him useful information, but teaching him to observe, to think, and to reason correctly.

## ART. III.—*The Transactions of the Provincial Medical and Surgical Association, Instituted* 1832. Volume IX. Pp. 583. London and Worcester, 1841.

IT is gratifying to observe this numerous and respectable Association proceeding so regularly in one of their great and leading objects, namely, the publication of useful and important memoirs and essays. The present is the ninth volume which has now resulted from their united labours; and, while every one must admit that they have already given to the profession a large amount of interesting and useful information, on medical topography, statistics, medical pathology and therapeutics, and forensic medicine, it must also be allowed that the present volume is by no means inferior to those by which it has been preceded.

It contains, after the usual report of the proceedings of the Association, which was held at Southampton in 1840, addresses by Dr Jeffreys, and Dr Steed, the Report by the Council of the Association on the Thackeray Prize, the question of Parochial Medical Relief and Vaccination, the Report on Medical Reform, the Report on Empiricism, the Report of the Benevolent Committee, and a short list of the medical papers and cases read to the Association.

Then follow the proper contents of the present volume in the order now specified.

The first is the Retrospective Address delivered in Surgery by Mr A. T. S. Dodd of Chichester, at the eighth meeting held at Southampton. Mr Dodd here takes a view of the principal modifications, rectifications, or additions made to our knowledge in anatomy, surgery, operative surgery, ophthalmic surgery, midwifery and operative midwifery, during the course of the previous twelvemonths.

The second article in the volume is the Retrospective Address in Medicine by Dr Roger Scott of Liverpool, giving a view of the corrections, additions, discoveries, and modifications made in anatomy, physiology, medical pathology, and therapeutics, during the course of the previous twelvemonths. In this address Dr Scott enters into considerable detail on the discoveries and rectifications in the nervous system, then takes a view of the physiology and pathology of the fluids, the petechial or spotted eruption of fever, the treatment of consumption, of disease of the kidney, diabetes and gravel, and the subject of *typhlitis* or the inflammatory disease of the cæcum.

In the third article, on the Medical Topography of Shrewsbury and its neighbourhood, Dr Ogier Ward gives a very interesting sketch of the meteorological peculiarities, geological relations, and mineral wealth of this district of the Silurian region, of the soil, the water, and the lakes and pools.

He then in the second chapter gives a short sketch of the civil and economical history of the district, embracing the agriculture, the vegetable productions, the live-stock, the game, the peasantry, and their mode of living, the fuel, the state of religious feeling, and education, and amusements.

In the second part of the memoir Dr Ward enters on the statistical and medical history of the district, and gives a full account of the diseases most prevalent in this division of Shropshire.

In the fourth article, Dr Lyon of Manchester gives an account of the statistics of rheumatism, illustrating the circumstances under which that disease principally prevails.

In the fifth article, entitled Observations relating to Injuries of the Scull and Brain, in which the use of the trephine is considered, Mr John M. Banner of Liverpool records a series of twenty-nine very interesting instances of injury of the scull and brain, some very severe, and several fatal. This article is one of great interest to the surgeon, and deserves the attentive and deliberate perusal of all who wish to understand the nature and effects of those injuries, and the extraordinary resources sometimes employed by the system to counteract these effects.

In the sixth article, on the Moveable Cartilaginous Bodies found in the Synovial and Serous Cavities, Dr James Macartney makes some judicious observations on the pathology of these bodies, and the treatment of the sufferings which they cause.

The seventh article is a case of Amputation of the greater part of the Lower Jaw, by Mr A. T. S. Dodd of Chichester. The case took place in a female of 31, and operation was rendered necessary by an encysted tumour of the lower jaw, which appeared to be rapidly destroying that bone. The greater part of the front or mental portion of the jaw was removed; the patient made a good recovery; and she uses the residual portion of the jaw with considerable facility and comfort.

In the eighth article, Mr Wainwright of Liverpool relates seven cases of tumours forming within the pelvis after labour, that is apparently of inflammatory swelling of the intra-pelvic cellular tissue, proceeding to suppuration, but all terminating favourably except in one case. In this case matter was formed upon and below the *iliacus internus* muscle, and had insinuated itself all round the vessels of the pelvis descending to the right hip-joint, the textures of which it destroyed.

In the ninth article, Mr George Mallett of Bolton-le-Moors, records several cases illustrative of the Pathology of Biliary Concretions. The following is the most interesting and curious, as showing the ravages which these bodies occasionally cause. We referred to it in another article; but it may be here given in the words of the author:

"A clergyman, of a phlegmatic temperament, and at times disposed to give way to melancholy, had suffered much from indigestion and its attendant phenomena, such as flatulency, acidity, vomiting, and pain in the epigastric region, extending occasionally to the back and beneath the sternum, his motions generally indicating a torpid action of the liver. These symptoms continued some time, when, about seven or eight years since, he had violent attacks of spasmodic pain, which remained for hours and then passed off; for six or eight weeks he continued subject to such attacks, which came on at uncertain intervals, and with a varying degree of intensity; they then ceased, and for about five years he remained tolerably well. At the expiration of that time he encountered many afflictions and much distress, and was again seized with his old spasmodic pains, from which, with short intervals of ease, he suffered more excruciating pain, for about twelve months, than I can remember to have witnessed before. His pains were so violent that, although possessed of a strong mind, he could not endure them without screaming aloud. Medicine seemed here of little avail; he went to various watering places for change of air and scene, but was not benefitted; the only thing that afforded him temporary relief was Batley's Sedative Tincture of Opium. This miserable state of existence continued till within about three weeks of his death, when he was attacked with severe rigor, followed by heats and copious perspiration. His pulse, which had never been more than sixty or seventy, now mounted to about one hundred and ten, sometimes more. Every morning a slight intermission of the fever took place, to be succeeded in the evening by the usual chain of febrile phenomena. All severe spasmodic pain had now ceased; but there was a great degree of soreness perceived when pressure was made upon a circumscribed spot intermediate between the hypochondrial and epigastric regions. Opinions as to the real nature of this case had varied: there never had been the slightest jaundiced state of the skin or conjunctiva, and the entire absence of this appearance during the progress of the case had thrown a doubt upon its pathology. But whatever might have been the previous condition of the parts, it was now evident that inflammation was going on, and it seemed most probable that an abscess had formed; consequently the termination could not much longer be protracted. Accordingly, in about three weeks from the commencement of the rigors, the patient was relieved by death from further suffering.

"A *post mortem* examination was made, which disclosed an ulcerated opening through the coats of the gall-bladder, communicating with an abscess beneath the concave surface of the liver, which contained about six ounces of pus. The ulceration was evidently caused by the irritation of a moderate-sized gall-stone, which was found near the opening, but still within the bladder. Upon examining the other organs, all were found in their natural condition with the exception of the pancreas, which contained a hard encysted body, and which proved to be a gall-stone about three-quarters of an inch in diameter. The pancreas was not found either in appearance or structure altered; and the concretion must have been imbedded there for some time, as no trace of its passage could be discovered.

"Thus, then, was explained the cause of his sufferings some years previously, and their cessation till another gall-stone had formed, and then expulsion in a similar way was attempted; but inflammation, abscess, and death were the consequences."—Pp. 465—467.

The tenth article is on the Influence of the Depressing Passions on the Health and on Disease, by Dr J. K. Walker of Huddersfield.

In the eleventh article, Mr Ryland gives a Report on the Diseases affecting the out-patients of the Birmingham Town Infirmary. Then follows a Report of the Cases attended at the Birmingham Eye Infirmary during 1838–39, by Mr Richard Middlemore. And lastly, comes a short paper containing suggestions as to a form of Register for Hospitals, Dispensaries, and Private practice, by Dr Charles Cowan.

In conclusion, we must say that the contents of this volume reflect much credit on the zeal, the industry, and the intelligence of the members of the Association.

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## Art. IV.—*Elements of Medicine.* Vol. I. *On Morbid Poisons.* By Robert Williams, M. D. Trinity College, Cambridge, Fellow of the Royal College of Physicians, and Senior Physician to St Thomas's Hospital. London, 1836. 8vo. Pp. 342. *Elements of Medicine.* Vol. II. *On Morbid Poisons.* By Robert Williams, M. D. &c. &c. London, Paris, and Leipsig, 1841. 8vo. Pp. 686.

Though this work appears under the title of Elements of Medicine, yet, if all the views of the author be well founded, it ought to be denominated a System of Toxicology. It is not meant, when we thus speak, that several, if not many, diseases, depend upon the operation of some morbid poison; that their symptoms are the effects of a morbid poison; and that, in conducting their treatment, this principle ought not to be lost sight of. But when we find a large proportion of the acute febrile disorders incident to the human race ascribed to the operation of poison, it necessarily follows, that the work in which the effects of this operation are described, and in which the antidotes to these effects are considered, must be viewed rather as a work on toxicology than as one on practical medicine.

The circumstances which appear to have led Dr Williams to take this view of the subject are the following :—

The course, symptoms, and morbid phenomena of typhous fever, and such diseases as scarlet fever and rose, which are believed and admitted to depend on the presence of a morbid poison, are determined so accurately, that little hope remains of any new facts being added to those already known. As all these symptoms and phenomena, however, are known and admitted to depend on the operation of a morbid poison, and as it seemed a demonstrable truth that, where a given disease could be shown to depend on the agency of a poison, in whatever manner generated, the laws and treatment of such affections must follow those of poisons generally, it remained to prove the truth of this hypothesis. The result of this attempt is the present work; and "if," says the author, "the argument shall be considered as established, it must be admitted that contagion is as important an element in medicine as *gravity* in mechanics, or electricity in chemistry." Such is the language the author holds in 1836, when publishing the first volume of *this* body of evidence. In 1841, when publishing the second, he is not less decided; and he seems to have acquired a greater degree of confidence in the truth and justice of his hypothesis as he proceeded in his undertaking.

"Though far from exhausting the subject," he says, "the present volume completes that amount of evidence which seemed to me necessary to demonstrate the doctrine of the specific action of morbid poisons,—a doctrine which has of late found many advocates both in this country and on the Continent. My experience since the publication of the first volume has afforded me many remarkable instances of the contagious nature of typhus fever, as also many additional proofs that the action of the typhoid poison on the mucous membrane of the alimentary canal is by no means uniform, and, indeed, that it is often altogether wanting. I have likewise seen many other striking examples of the spread of the contagion of erysipelas."—Preface, Vol. ii.

We do not know, that we are quite capable of perceiving the conclusiveness of this train of reasoning. The author manifestly proceeds throughout on the principle, that all the animal and morbid poisons, and all other poisonous agents, operate on the animal economy exactly in the same manner in which, as we understand him, the vegetable and mineral and aeriform or gaseous poisons operate. This may assuredly be the case; but we are not aware that it has been proved to be the case.

The author also seems to proceed on the principle that all the alleged poisonous causes of diseases act in the manner, and according to the laws of contagion. Now this idea is surely by no means proved; and there are many facts in medical pathology and the history of diseases, with which it is completely at variance. To take a very common example, there are few points which can be regarded as more generally admitted among physicians, or established on better grounds, than the inference that ague and remittent fever, and the most violent forms of endemic fever, depend upon the operation of that poisonous agent which is called miasma, telluric emanation, or malaria. Yet no one supposes at present, whatever might have been done in former times, that ague or remittent fever are contagious diseases, or that they are propagated like contagious diseases; and though some weak persons and hasty superficial observers yet speak of endemic and yellow fever as being contagious, this idea not only finds no favour with those who have had extensive opportunities of seeing the disease, but it is positively ridiculed.

Typhous fever is very generally, if not universally allowed to be a contagious disease; and if there be instances of it which seem to spring up spontaneously in certain localities, and at certain seasons of the year, and under a peculiar concurrence of circumstances, still it is so frequently seen to spread from one person to another in communication or contact more or less close, that it is scarcely possible to doubt that it is most usually a contagious disorder, or at least, after its first generation, that it is propagated by contagion. There is, therefore, nothing new in this part of the author's doctrine, and nothing to which rational or experienced observers could object. Nor is it extraordinary that he found the proofs of contagious characters and propagation to multiply, the more he observed; for this is only what takes place in other instances of the like nature. But, when he tells us that it must be admitted, that contagion is as important an element in medicine as gravity in mechanics, or electricity in chemistry, we are perplexed with the inequality of the objects of comparison, and unable to perceive how the inference can be legitimately deduced. or candidly admitted as to all the three predicables. Gravity is a principle of most extensive, nay, universal application in mechanics. Electricity is certainly neither a principle of general nor extensive application in chemistry; and, so far at least as facts go, contagion does not seem to be a principle of very general application in medicine.

These circumstances appear, at first consideration, serious objections to the correctness of this hypothesis. But we will not dwell on them longer; but proceed at once to notice some of the leading peculiarities of the system of Dr Williams.

The author begins by dividing the causes of disease into two great tribes or classes; the first, he says, among other deleterious agents, embraces mechanical injuries, errors in the quantity and quality of diet, chemical or mechanical changes in the atmosphere, with many moral and physical affections. This class of disturbing causes gives rise, according to him, to diseases of simple inflammation, to the neurosis, hemorrhagia, dropsies, and to those morbid secretions or depositions which occasion diabetes, cancer, phthisis, or other malady, according to the idiosyncrasy of the patient.

The second class of causes are miasmata, secreted either by the patient's person, or generated by other sources, known or unknown, and which contaminate the healthy recipient, either through the medium of the atmosphere, or by direct contact. This class, he adds, engenders disease of a specific character, and which are either simply contagious, as syphilis, hydrophobia, the plague; or both infectious and contagious, as typhous fever, scarlet fever, or the plague, It embraces also diseases which have neither of these properties, as the great class of putridal fevers and cholera.

We cannot refrain from thinking that, in this statement of the distinct causes, there is, with an appearance of accuracy, some confusion. Thus, when we find among the first class, "many moral and physical affections," we are tempted to ask what is meant by a physical affection. Is it a mechanical or chemical injury, or is it a disease or some physical state of the human body? In either case it is manifest, that it is both vaguely and erroneously set down.

It is also to be observed, that the author employs the term *miasmata*, not in the limited and strict sense in which it is used by the majority of accurate writers, to designate solely emanations or vapours issuing from the soil, but all kinds of poisonous or morbific vapours; embracing thus not only terrestrial emanations, but the effluvia exhaled from the bodies of men and animals. Instead of advancing, it appears to us that this is retrograding, as it is throwing aside a very good and clear distinction, which has been long received and in general use.

Dr Williams proceeds to remark on poisons in the following manner, as regulated in their action by certain general laws.

> "Poisons, of whatever nature, are subjected to certain general laws. The most important of these laws are;—Firstly, that poisons have all certain definite and specific actions; Secondly, that they lie latent in the system a certain but varying period of time, before those actions are set up; and, Lastly, that the phenomena resulting from the poison, when roused into action, vary according to the dose or the predisposition of the patient. These laws are common to all poisons; there are also many others which are peculiar to individual poisons, or classes of poisons, and it may be necessary to notice a few of them.
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> "The law of the definite and specific actions of poisons results from physical principles; for if it be supposed that agents acting on the human body do not produce their effects according to certain definite laws, and therefore not out of physical principles, we can neither determine the seat or course of any given disease, nor judge

of the operation of remedies. The definite action of causes is the basis of human knowledge, and is equally true in medicine as in every other science, No physician, for example, has seen castor-oil produce tetanus, or colchicum intoxicate the brain, or opium inflame the spleen; he perfectly well knows that the first of these substances acts on the intestines, the second on the ligaments, and the third on the nervous system generally. The action of poisons, therefore, is not accidental, but governed by certain definite laws. The action of poisons, though definite, is variously limited. Some poisons, for instance, act on one membrane, or on one organ, or on one system of organs; while others extend their influence over two or more membranes, or organs, or system of organs, of the animal frame. We have examples in aloes and jalap, of substances that act on one membrane only, or on the mucous membrane of the intestinal canal; in digitalis, of substances that act on one organ, or the heart; while strychnine is an example of a medicine acting on a system of organs, or on the spinal chord, since, when given in a sufficient dose, it produces violent action of all the voluntary muscles.

"It is seldom, however, that the action of poisons is limited to one membrane, or organ, or systems of organs; the greater number of these noxious agents more usually act on two or more membranes, or organs, or systems of organs. Elaterium, for instance, acts on the mucous membrane of the intestinal canal, and on the kidneys. Tobacco nauseates the stomach, and affects the heart. Antimony is an instance of a remedy having a still more extensive range of action: it induces violent perspiration of the skin; acts cathartically and emetically, and in large doses causes gangrene of the substance of the lungs. Alcohol and opium are also examples of substances acting generally on three great nervous systems, producing infinite disturbance of the brain, the chord, and the great sympathetic, and subsequently setting up limited or specific local actions: the alcohol destroying the coats of the arteries, while the opium disorganizes the brain. In these respects the action of these latter substances greatly resembles those of many morbid poisons, as those of typhus fever, scarlatina, &c. &c."—Pp. 3–4.

"Another minor law of medicinal poisons is, that some are cumulative, while others are either not absorbed into the system, or else are so rapidly removed that no cumulative effect is produced; thus in persons predisposed to the action of the remedy, a dose of digitalis, so small as to produce no sensible effect whatever, will, if frequently repeated, at last destroy the heart's action; and in cases in which it is desirable to produce vomiting at the least expense to the constitution, the means employed are cumulative, or a repetition of small doses of ipecacuanha or other emetic substance.

"This cumulative property of poisons is by no means universal. There is no instance, for example, of jalap or castor oil proving cumulative; and if a frequent repetition of them produces an increased effect, it is perhaps in consequence of the nervous papillæ, with which they are brought in contact, being more easily irritated by each application; and hence they induce a more violent result.

"The second important law of poisons is, that they lie latent in the system a period of time, which varies in different individuals, before they set up their specific actions. Rhubarb, for instance, produces no immediate result, but lies dormant in the system from six to eight hours before its action is sensible on the bowels. Opium, in the usual dose, is generally thirty minutes before it subdues the brain to its influence. The convulsions caused by strychnine do not follow till twenty minutes after the exhibition of that substance; and perhaps every substance except hydrocyanic acid has a greater or less period of latency.

"When a medicine, however, acts on more parts than one, a considerable space of time may elapse after it has affected one organ before it affects another. Thus digitalis frequently occasions emesis before it acts on the heart; and the action of mercury is frequently sensible for many weeks on the bowels before its ultimate action on the salivary glands is set up. The doctrine of the latency of poisons is indeed so generally admitted, that their actual period of latency has been a point on which the condemnation or acquittal of a prisoner tried for murder has turned in our courts of justice.

"The third great law of poisons is, that being once roused into action, their effects are at all times much modified by the dose, the temperament, or present state of the constitution of the recipient. The effect of the dose in modifying the pathological phenomena of disease may be exemplified in the actions of oxalic acid and arsenic. The specific action of oxalic acid is to inflame the mucous membrane of the stomach; but to ensure this effect the dose must be limited, so that it may lie in the system many hours. On the contrary, if the dose be excessive, and rapidly absorbed, it so disorders all the functions of the three great nervous centres that life is destroyed in consequence of this irritation in a few minutes, and not a trace of disease is to be found in any part of the body. Arsenic is likewise a poison that requires some hours to set up its specific actions; so that when the dose is large it destroys by general irritation, and not a trace of morbid change is to be found after death. It follows from this law that the larger the dose, or the greater the intensity of the poison, the more rapid its action, and the less the probability of finding any trace of specific disease."—Pp. 5–6.

Then comes the comparative view between medicinal and morbid poisons.

"The general laws observable in the actions of morbid poisons are for the most part precisely similar to those which govern medicinal substances, or only differ in a few minor points. These poisons have their specific actions—their periods of latency, while their phenomena equally vary according to the dose, or the predisposition of the patient.

"The specific actions of morbid poisons are distinctly proved by the fact that we are enabled to determine within certain limits the course, the symptoms, and the pathological phenomena which result from the presence of any given morbid poison of ordinary frequency of occurrence. No man, for instance, can confound the phenomena of small-pox with those of intermittent fever, or those of intermittent fever with syphilis, or those of syphilis with cholera; each of these poisons has its separate and peculiar laws, and consequently its actions are definite and specific.

" The actions of morbid poisons, however, like those of medicinal substances, are variously limited, some affecting only one membrane or organ, or system of organs, while others involve two or more membranes, or organs, or systems. Thus *tinea capitis* is an example of a poison acting on one tissue of the body, and even then partially, namely, on the cutaneous tissue of the head. The waters of Switzerland contain a poison, whose action is limited to the thyroid gland. The contagion of hooping-cough, and the virus of hydrophobia, affect all the organs supplied by the eighth pair, or pneumogastric system. Instances of morbid poisons acting on two or more membranes, or organs, or systems of organs, are still more common, and form the great body of this class of disease. The poison of measles, for instance, acts no less on the mucous membranes of the eyes, nose, fauces, and perhaps even on the mucous membranes generally, than on the skin. That of scarlatina acts more especially on the mucous membranes of the fauces, also on the skin, the synovial membranes, and also on the peritoneum, occasioning ascites. The paludal poison has a still more extensive range, no organ or tissue of the body being exempt from its destructive ravages.

" Morbid poisons may coexist in the same individual, and even produce on some occasions their specific effects on the same membrane at the same time. Erysipelas is frequently seen to co-exist with syphilitic eruptions. The eruption of measles with that of small-pox was formerly not uncommon. Examples of morbid poisons affecting different tissues are still more frequent; thus syphilis may co-exist with hooping-cough, with measles, with the vaccine poison, and with a great variety of dissimilar diseases.

" Morbid poisons also, like other poisons, have their periods of latency; and, generally speaking, a much longer time elapses before their specific actions come into operation, than takes place with medicinal substances. The virus of the natural small-pox lies dormant from sixteen to twenty days before it produces any constitutional disturbance; and a still further period elapses of three or four days before the specific eruption appears on the skin. The poison of scarlatina lies latent from seven to ten days after exposure to the contagion; that of measles from ten to fourteen; while the poison of paludal fever has been known to lie dormant for a twelvemonth, and that of hydrophobia for a still longer time. These are examples of periods of latency far beyond any thing that has hitherto been observed in the actions of medicinal substances.

" When morbid poisons act on more tissues or organs than one, their actions are sometimes simultaneous; but more commonly they are consecutive, and frequently long intervals of time elapses between each successive attack. Thus the poison of typhus fever may attack the lungs, the membranes of the brain, and mucous membrane of the alimentary canal, and all these may be attacked contemporaneously; but it is more common that these attacks take place consecutively; or on the alimentery canal, then the brain, and lastly, on the lungs. In syphilis, cases have been met with in which the throat, the skin, and the bones, have been affected at the same time with the primary sores. It is more common, however, for these secondary symptoms, as they are termed, to occur, if not altogether seriatim, yet at very remote periods from the primary affections, so that many years frequently elapse before the poison has entirely exhausted itself. In scarlatina also, the peritoneum is not affected till many days after the eruption of the skin and the ulceration of the throat have altogether disappeared.

" It occasionally happens that morbid poisons, which usually act on a plurality of membranes, exhaust themselves on one or more, without affecting the whole series. In the disease termed scarlatina simplex the poison exhausts itself entirely on the cutis, without affecting either the mucous or serous membranes of the body. The rubeola sine catarrho is a similar example. Intermittent fever, when the dose of the poison is limited and the disease properly treated, seldom involves any organ or tissue; yet left to run its own course, scarcely an organ or tissue would escape the destructive actions of the poison.

" Sometimes when a poison acts on many membranes, the usual order of attack is inverted. It is the general law of syphilis, that the bones are the last in the order of the secondary symptoms to suffer, but sometimes they are the first to be affected. In scarlet fever the affection of the skin may precede that of the throat, or the reverse; and in fever the affection of the head may precede that of the intestines, though the latter is most common.

" When two morbid poisons co-exist in the same system, their actions, it has been seen, are sometimes simultaneous, and each disease runs its course unaffected by the presence of the other. The more usual law of febrile poisons perhaps is, that when two of them co-exist, the one lies latent, while the other runs its course; or they interrupt each other's progress, the active one becoming latent, while the latent one becomes active; and occasionally they also modify each other's actions. A case of intermittent fever was admitted into St Thomas's Hospital, which was not controlled in the usual time by medicine; suddenly, however, it subsided, and the small-pox appeared. The small-pox having run its course, and the patient being recovered from that disorder, the intermittent fever returned, and the disease now readily yielded to quinine. A child having been exposed to the infection of small-pox was vaccinated; in a few days, however, the small-pox appeared, and ran a very modified course. When the small-pox had entirely subsided, some action was seen in the punctured part of the arm, and the cow-pox vesicle formed, but not till three or four weeks after the time it usually appears, and was exceedingly small.

" It has been seen that the period of latency of medicinal substances being passed, and their actions set up, that their effects varied in a considerable degree according to the dose. It unfortunately happens with morbid poisons, that the living body is the only measure we possess of the strength or dose of the miasmata. It is impossible, therefore, to speak on this law, except in conjunction with the temperament or susceptibility of the patient; but thus considered, the law holds equally good with respect to morbid as to other poisons. There can be no question but the paludal miasmata of tropical countries, greatly exceed in intensity those of more temperate climates; and accordingly in many cases hardly a trace of disease is to be found after yellow fever, so intensely severe and rapid is that disorder. In the Walcheren fever, on the contrary, a disease perhaps equally fatal, but more chronic and of less intensity, enlarged livers, disorganized spleens, and dropsy, marked every case. There are many instances recorded by Jenner and others of children whose constitution has been greatly susceptible of the poison of the small-pox, having died even after inoculation from convulsions, and general nervous irritation, and before the more specific action on the skin has been induced. It may therefore be laid down as a general law, that when a morbid poison acts with its greatest intensity, and produces its severest forms of disease, fewer traces of organic alteration of structure will be found than when the disorder has been of a milder character.

" As a general principle also, it may be stated that morbid poisons act with an intensity proportioned to the feebleness of the constitution of the patient; but this law is not universal. The hardy mountaineer is a surer victim of paludal fever, whether he visits the low countries of the tropics, or the marshes of a more temperate climate, than the feebler native of those countries. The immunity the latter enjoys compared with the former, is probably owing to his habit of living in the noxious atmosphere; for let him remove to a more healthy climate and then return to these regions of pestilence, and he will be found as susceptible of the poison as the hardiest stranger. The state of plethora, or otherwise, of the blood-vessels has, in many instances of cholera and of hydrophobia, been shown to greatly influence, and even to suspend the particular phenomena incident to those poisons."—Pp. 8—12.

In these passages are contained the leading and essential principles of the doctrines of Dr Williams. The rest of the first volume consists chiefly of an application of those principles, as illustrated in the history of the phenomena and progress of typhous fever, scarlet fever, measles, small-pox, and the vaccine disease, varicella, or chicken-pox, erysipelas, and hooping-cough.

It is unnecessary to enter minutely into the examination of the author's histories of these several diseases. They contain a large amount of information, which, though not entitled to the character of new, is highly useful, and is certainly placed in a new and interesting light; and in several of the chapters the author illustrates his views and the general characters of each disease by instructive cases. Thus the chapter on typhoid fever, which has evidently been composed with much care, is illustrated by the detail of ten cases of the disease.

In speaking of the prophylactic treatment, Dr Williams states, that chlorine gas, to which so much efficacy as an antidote or destroyer of contagion has been ascribed, appears to him, after pretty ample experience, to possess no such power. At this conclusion we confess we are not surprised; for it has long occurred to us to observe, that, notwithstanding the liberal use of this vapour, fever was not prevented from spreading in situations where it was already prevalent. Dr Williams, like all good practical physicians, has arrived at the conclusion, that the most effectual means for preventing the propagation of fever consist in the rigorous observance of cleanliness, separation and ventilation.

In the second volume, Dr Williams gives a full history of the phenomena and effects of the Vaccine disease, Syphilis, Gonorrhœa, Hydrophobia, Plague, Inflammation of the Cellular Tissue, Farcy, Porrigo, Ague, Dysentery, Cholera, and Influenza.

In the first essay, on the Poison of Cow-Pox, he has introduced all the information collected by Macpherson in India, Ceely in England, and Bousquet in France. In the second, on Syphilis and its effects, the observations and experiments of Ricord are shortly considered, and rather an ample description of the syphilitic secondary symptoms and cutaneous eruptions is given; and he considers carefully the effects of iodine, hydriodate of potass, and proper dietetic treatment in the removal both of primary and of secondary symptoms. Next comes a good account of the symptoms and effects of the gonorrhœal poison.

Dr Williams then gives an account of the phenomena and morbid effects of Canine Madness, or the symptoms caused by the inoculation of the poisonous saliva of the dog, wolf, and fox.

Under the name of *Cellulitis Venenata*, the author gives an ample account of the effects produced by wounds received in dissection, and which have been generally ascribed to the effect of a poisonous agent conveyed from the fluids of the dead body to the exposed or abraded surface of the living.

Under the name of the Poison of Farcinoma, Dr Williams includes all those effects which arise in consequence of the application of the poison of glanders to the human frame.

The histories of these diseases are delivered much in the same manner, with the principle that they all depend on the presence and operation of poisons. It must be allowed, nevertheless, that the author does not permit this idea to modify or influence inordinately the descriptive portions of his work, and all are given as if the hypothesis was not necessarily connected with them, although the facts are arranged so as to corroborate and establish the hypothesis. Dr Williams has, in short, undertaken and performed an experiment, to show to what extent the phenomena and effects of the diseases contained in the preceding list can be explained by referring them to the laws, by which the operation and effects of poisons are regulated. Of his success we do not pretend to speak; for though several of his positions, especially those relating to the poisonous character of the agents, were established, it does not follow that all are well founded. The inquiry is, nevertheless, very important, and may give rise to many new and interesting views.

Meanwhile, it seems still doubtful with what justice a work like the present can be denominated Elements of Medicine. It seems more justly, if the ideas of the author be just, to be a Treatise on Toxicology, or at least on Morbid Poisons; and, as it is obvious that there is a numerous tribe of diseases, the phenomena of which do not depend on, and cannot be referred to, the operation of poisons, the whole of them are by this method excluded from consideration.

We are anxious, nevertheless, to introduce the present work to our professional brethren in the spirit of candour and liberality. Dr Williams is evidently not only a careful observer, but a person of an original and energetic mode of thinking. As the promulgator of a new hypothesis, which may eventually in some respects acquire the force of a theory, he has a right to be heard attentively, and without prejudice. Our chief object in the present article is to direct attention to his speculations, and to induce our brethren to peruse his work with deliberation.

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## Art. V.—*Descriptive Catalogue of the Preparations in the Museum of the Royal College of Surgeons in Ireland.* By John Houston, M. D. M. R. I. A., Curator of the Museum, &c. Volume I. Anatomy. Dublin, Edin., and London, 1834, 8vo. Pp. 250. Volume II. Pathology. Dublin, Edin., and London, 1841, 8vo. Pp. 604.

In the thirty-third volume of this Journal (p. 391) we took a short historical view of the rise of museums or collections of objects, illustrating the nature and structure of the organs of the animal body, and of the catalogues of the objects published; and we gave an account of several of the principal catalogues of that description which have been already published; and more especially of the catalogues of the anatomico-pathological museum of Guy's Hospital, by Dr Hodgkin, and that of the College of Edinburgh, by Mr Mackenzie.

Though we then mentioned most of the catalogues published previous to that time, 1830, we did not mention all. Probably, for instance, it would have been right to notice the descriptions and the drawings of diseased bones, published from the Museum Hovianum, by Andrew Bonn, the former published at Leipsic in 1784, the latter in 1785, in folio, and afterwards three volumes 8vo, between 1785 and 1789; since the former is a descriptive catalogue, and the materials of the latter are arranged much in the manner of a catalogue.

We should have certainly noticed, had our limits permitted, the excellent catalogue of the Berlin Museum, by John Gottlieb Walter, the two first parts of which were published in 1796, and afterwards the whole was published in a collected shape in 1805, in three volumes quarto.

The German edition of this work, which appeared at Berlin in 1796, in two parts, forms a very useful and instructive account of the anatomico-pathological treasures of the Museum of John Gottlieb Walter, then Professor of Natural History and Anatomy in the Royal Medico-Chirurgical College of Berlin. It is illustrated with five plates, containing delineations from nature of more than 80 calculi, urinary, biliary, and intestinal. This catalogue was prepared by Frideric Augustus Walter, the son of the professor, under his own eye and superintendence, and appears to have been intended as a detailed description of many of the objects.[*]

This catalogue, however, appears not to have been meant for general and public use; for in 1806 the author, or rather proprietor, published, at the expense of the Royal Prussian Military School, as a complete catalogue, one in the Latin language, in three parts or volumes. In the preface to this catalogue, he informs us that he had spent more than 10 lustrums or 50 years, in collecting the preparations of which it consists, and that he had dissected with his own hand, or seen dissected by his pupils, more than 8000 dead bodies. As this is manifestly the finished catalogue which Walter was anxious to deliver to posterity, we shall shortly glance at its contents and arrangement.

The work, as we have said, consists of three parts or volumes. The author first gives a general index or inventory of all the preparations, numbered, as they stand in the museum, arranged in five sections or divisions. From this it appears that the total number of the preparations amounted in 1806 to 3092.

Since that time their number has been very greatly augmented under the successive superintendance of Rudolphi and Müller.

The first part consists chiefly of preparations preserved in spirits or similar conservative liquors. They are subdivided into four sections; the first, entitled Ex hominibus, Naturalia; the second, Ex hominibus Non-naturalia; the third, Ex animalibus, Naturalia; and the fourth, Ex animalibus, Naturalia.

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[*] Anatomisches Museum. Gesammelt von Johann Gottlieb Walter, Dr der Arzneigelahrtheit, erster Professor der Naturlehre und Anatomie am Konigl. Collegio Medico-Chirurgico in Berlin; &c. &c. Beschrieben von Friedrich August Walter, Dr der Wundarzneikunst und s. w. Erster theil, pp. 176. Zweiter Theil. p. 192. Berlin, 1796. 4to.

Under the first head, which is intended to illustrate the normal structure of man and animals, are arranged preparations of the brain and nervous system, the organs of sense; those of circulation, the liver, gall-bladder, spleen, and the parts of the alimentary canal; the organs of generation in the two sexes; the products of generation; differences between the fœtus and the adult; preparations illustrating the origin and progress of ossification, dentition, and a few intestinal worms.

The second section, entitled Ex Hominibus non Naturalia, contains preparations of the same classes of organs and textures, either in the morbid state, or deranged by malformation. Several good cases of aneurism, and various diseases of the liver and kidneys, are here preserved; but perhaps the most valuable part are the morbid and monstrous products of generation. This section is concluded by instances of steatomatous and other encysted tumours, and various examples of diseased bones.

The third section, entitled Ex Animalibus Naturalia, contains specimens of various organs in the healthy state from the lower animals; and the fourth section of this part contains a few specimens of the same order of organs in the diseased state, the large proportion being monsters of quadrupeds and birds.

The second part or volume contains the account of the dry preparations, and, like the first, is divided into four sections upon the same principle as that.

The third volume consists of two parts, viz. the third and fourth parts. The former contains the inventory of all the earthy concretions and calculi from the urinary organs, the biliary organs, or other parts, furnished either by the bodies of men or animals. It is subdivided into three sections, one devoted to urinary calculi, arranged under the two heads of renal and vesical calculi; another allotted to gall-stones; and a third to earthy concretions, including intestinal concretions, salivary concretions, bony tumours from the brain, the epididymis, the ovary and Fallopian tubes, urinary concretions found in unusual situations; and all the different sorts of calculi furnished under the name of Bezoars from the bodies of the lower animals.

We have been speaking of gall-stones in two previous articles. Several instances of the modes in which they come to the surface are here noticed. No. 159 are two lamellated gall-stones expelled by an ulcerated opening between the ninth and tenth ribs, weighing one drachm, one scruple, and ten grains, from a man of 60, who died. No 214, are four lamellated gall-stones, weighing five drachms and one scruple, cut by Kluge, an eminent surgeon of Strausberg, from an ulcer in the right hypochondrium of a woman of 70 odd years, who completely recovered. No. 215 contains 69 lamellated biliary calculi, weighing in all two drachms, one scruple, and ten grains, cut by Lahrmann, an eminent surgeon of Berlin, from an ulcer in the belly of a female of 72, and who also recovered.

From the great number of these bodies preserved in this collection, amounting to 103, all except those mentioned, and three expelled by the anus, found in the body after death, there seems reason to believe that the presence of gall-stones is not an uncommon disease in Prussia.

The fourth part is devoted to preparations of diseased, injured, fractured, or malformed bones; and contains of these a pretty ample and varied collection. The preparations are enumerated and shortly described in the following order; softening or *mollities ossium;* enlargement or swelling of bones, general and partial; tophi or earthy deposits; ricketty bones; bones affected with *spina ventosa;* instances of diseased spine; exostosis; ankylosis; necrosis; internal caries, that is from the medulla, the bone, or the periosteum; external caries, viz. that is, from suppuration or ulceration of parts external to the bone; spurious caries, or the wearing and absorption produced by pressure of soft parts or aneurisms; fractures, and their effects, luxations and their effects, and malformations.

The whole is closed with a list of the skeletons and crania of the human body, perfect or imperfect, and a similar list of the skeletons of a considerable number of quadrupeds, amphibia, and birds.

This catalogue belongs to the division which is designated as descriptive, that is, most of the titles of the preparations are accompanied with short descriptive notices, illustrating the history of the case, and its pathological peculiarities. At the same time, these descriptions are not so ample and detailed as in the German descriptive catalogue, published in 1796; and often for more full accounts, references are made to that catalogue, or to the Berlin memoirs, or some work published by J. G. Walter, or his son, or some one of his pupils. This, however, is the more extensive and comprehensive of the two catalogues. The other, in many particular cases, gives more detailed descriptive accounts. *

At the close of that article we expressed the hope, and made a recommendation that catalogues similar to those of the continental museums, and to that of Guy's Hospital, should be published by the Royal Colleges of London, Dublin, and Edinburgh, of their respective collections. The Museum Council of the Royal College of London have made considerable progress in the publication of a catalogue of their valuable and extensive collection. But, as it is not completed, it would be unreasonable to enter on its consideration.

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* Museum Anatomicum, per decem, et quod excurrit lustra, maximo studio congestum indefessoque labore perfectum, a Johanne Gottlieb Walter, a Consiliis intimis Regis Borussorum, M. D. Physices et Anatomiae Professore Primario Collegii Regii Medico-Chirurgici Berolinensis, &c. &c. Nunc pro summa Frederici Wilhelmi Tertii Borussor. Regis Augusti Munificentia ac Liberalitate publici juris factum. Tomus i. ii. iii. Berolini, 1805, 4to.

The Dublin College have completed their catalogue; and we propose at present shortly to direct the attention of the profession to the work which has appeared from that learned body.

The catalogue of a museum may be prepared in one of two modes. It may be either a mere inventory of objects, or an enumerative list, that is simply specifying the objects by name and number, without giving any other information on their history or nature; or it may consist not merely of the enumerative list, but of short descriptions illustrating the history of the objects and preparations. The former is seldom of much use to any one not visiting the museum, or residing in its neighbourhood. The latter, which is properly what is termed a descriptive catalogue, is much more extensively useful; for though its utility is greatly increased by the reader comparing the objects personally with the catalogue in his hand, nevertheless, if he have once seen them, the description recals the characters and peculiarities of the objects so perfectly, that he can at all times refer to the catalogue with the confident hope of obtaining certain and useful information. There is yet another mode in which the descriptive form of catalogues is here beneficial. Where the description is ample and accurate, which it may very properly be, if not of all the preparations, yet of several of the most rare, the most curious, or the most important, the reader may, by referring to it, at once know, whether the preparation is of that kind as to justify him in inspecting it personally, and studying with his own eyes facts, of which he may not have a very clear or correct idea, without personal examination.

The Catalogue of the Preparations contained in the Museum of the Royal College of Surgeons in Ireland belongs to the second class of the kind of publications now mentioned. It consists of two parts, each corresponding to the division into volumes. The first volume is devoted to the description of those preparations which in general demonstrate the healthy structure of organs. We say in general; for there are contained in it not a few instances of malformation; and there is set apart a division for monstrous productions. This, we think, is a slight deviation from the best mode of classification which might perhaps have been more properly avoided. Excluding, however, the exceptions now specified, the order has been correctly observed.

The preparations are chiefly of parts or the whole of the human body and many of the lower animals, especially where the nature and characters of these preparations tend to throw light on various points in the structure of the organs. The preparations in the first part, in short, may be said to be anatomical, physiological, and zoo-anatomical.

Like the preparations, the Catalogue is arranged in the manner which physiologists have agreed is the most suitable for studying the anatomical structure of the organs in their physiological relations. The method of arrangement is so well explained by the Curator in his preface, that we cannot do better than give it in his own words.

"In the anatomical department, all the preparations are arranged in eight classes, which are severally distinguished both in the catalogue and in the presses by letters of the alphabet in roman characters.

"The first class, distinguished by the letter A, contains all the organs concerned in this assimilation of food.

"The second by B, contains the organs of circulation.

"The third by C, the organs of respiration.

"The fourth by D, the organs of sense.

"The fifth by E, the organs of locomotion and prehension.

"The sixth by F, the organs of generation and secretion of urine.

"The seventh by G, monsters of all kinds; and

"The eighth by H, contains specimens in natural history, *illustrative* of some peculiarities of organization.

"These classes are again subdivided into orders, the numbers of which vary with the most convenient subdivisions which each admits of, and are distinguished by letters in italics. Thus the first class embracing all the series of organs concerned in the assimilation of the food, and distinguished by the roman letter A, admits conveniently of subdivision into four orders.

"In the first marked *a*, are contained those parts of the alimentary system, which, in the form of preparations, can be most conveniently grouped and exhibited together, viz. the mouth, tongue, pharynx, and œsophagus.

"The second order *b*, contains preparations of the stomach.

"The third *c*, those of the intestines.

"The fourth *d*, the glands connected with the intestines.

"The same mode of subdivision into orders, and of marking by appropriate letters in italics, is observed throughout the other classes. (See table. p. 9.) The preparations of human and comparative anatomy are placed side by side throughout the museum, and are arranged in the several orders to accord with the classification of Cuvier, as adopted in his Leçons d'Anatomie Comparée. Those of man, are placed first in the scale; next, those of the quadrumana, which are followed in order by preparations of the carnivora, rodentia, &c. down to the lowest tribe of animated beings, the zoophytes." —Pp. 4—6.

The first volume is further subdivided into two parts; the first, the descriptive portion; the second, an index or inventory of all the preparations contained in the Museum, marked with their respective letters and numbers, so as to indicate their position in the collection. The former is of course the most instructive. It contains attached to such preparations as require it, short histories and descriptions of the preparations, but sufficiently detailed to enable the anatomist, physiologist, and pathologist, to study them with advantage to their individual views.

At the end of the volume is a short description of a collection of wax models illustrative of the structure of several parts of the human body.

The second volume is devoted to the illustration of the specimens of morbid anatomy contained in the museum ; and, judging from the size of the volume, and the numerical amount of the preparations, we should say that the pathological department of the collection is much more extensive than the anatomico-pathological division.

The arrangement is conducted very much in the same plan as in the department of healthy anatomical structure; and we shall allow Mr Houston to state it in his own language.

> " The preparations (in the department of morbid anatomy,) are distributed into six classes, which are severally distinguished both in the catalogue and in the presses by letters of the alphabet in roman characters.
>
> " The first class, distinguished by the letter A, contains all the organs concerned in the assimilation of food.
>
> " The second, by B, contains the organs of circulation.
>
> " The third, by C, the organs of respiration.
>
> " The fourth, by D, the organs of sense.
>
> " The fifth, by E, the organs of locomotion and prehension.
>
> " The sixth, by F, the organs of generation and secretion of urine.
>
> " These classes are again subdivided into orders, the numbers of which vary with the most convenient subdivisions which each admits of, and are distinguished by letters in italics. Thus, the first class, embracing all the series of organs concerned in the assimilation of the food, and distinguished by the roman letter A, admits conveniently of subdivision into four orders.
>
> " In the first, marked *a*, are contained those parts of the alimentary system, which, in the form of preparations, can be most conveniently grouped and exhibited together, viz. the mouth, tongue, pharynx, and œsophagus.
>
> " The second order, *b*, contains preparations of the stomach.
>
> " The third, *c*, contains those of the intestines.
>
> " The fourth, *d*, the glands connected with the intestines.
>
> " The same mode of subdivision into orders, and of marking by appropriate letters in italics, is observed throughout the other classes."—Pp. vii. and viii.

The plan according to which the whole of the specimens in the collection are classified, may be understood from the following tabular view :—

|  | CLASS. |  | ORDER. |
|---|---|---|---|
| A | ORGANS OF ASSIMILATION. | A. *a.* | Mouth, tongue, pharynx, œsophagus. |
|  |  | A. *b.* | Stomach. |
|  |  | A. *c.* | Intestines. |
|  |  | A. *d.* | Glands concerned in digestion. |
| B | ORGANS OF CIRCULATION. | B. *a.* | Lymphatics, lacteals, and their glands. |
|  |  | B. *b.* | Heart and pericardium. |
|  |  | B. *c.* | Arteries and veins. |
|  |  | B. *d.* | Blood and other fluids. |
| C | ORGANS OF RESPIRATION. | C. *a.* | Larynx, trachea, bronchi. |
|  |  | C. *b.* | Pleuræ, lungs. |
| D | ORGANS OF SENSE. | D. *a.* | Brain, nerves, ganglia. |
|  |  | D. *b.* | Organ of sight. |
|  |  | D. *c.* | Organ of hearing. |
|  |  | D. *d.* | Organ of smell. |
|  |  | D. *e.* | Tegumentary membranes and cellular tissue. |
| E | ORGANS OF LOCOMOTION. | E. *a.* | Bones of the skeleton. |
|  |  | E. *b.* | Joint, bursa, ligament, muscle. |
| F | URINARY AND GENITAL ORGANS. | F. *a.* | Kidney, bladder. |
|  |  | F. *b.* | Male: prostate, urethra, testicle, vesiculæ, penis. |
|  |  | F. *c.* | Female: ovarium, uterus, fœtus and membranes, mammæ, &c. |

The descriptive part of the catalogue is executed with great care and fidelity; and the information conveyed is both accurate and instructive.

"In preparing the catalogue for publication, every exertion *has* been made to secure an accurate report, both of the history and recent pathological appearances of every preparation. The account given of each is, in fact, a condensed abstract, made by the author from the most authentic sources, viz. either from the verbal or written communication of the donor, or from some printed statement authorized by him,—all such abstracts being studiously curtailed to such dimensions, that, while connecting intelligibly the *post mortem* appearances with the history of the disease during life, they might not be unsuited to the pages of a work like the present."—P. xi.

We can assure our readers, that, after perusing considerable portions of this catalogue, we can justly say, that Dr Houston has been most industrious and scrupulous in adhering to the principles here specified. We can in no other mode express our conviction of the excellence of this catalogue than by saying, that it makes, in the amplitude and accuracy of its descriptive details, a near approach to the excellent catalogues of Sandifort and Walter, and may justly be placed by the side of the catalogue of the Guy's Hospital Museum. It is not accordant with the nature of a notice like the present, to enter into a detailed examination of the contents of these volumes; but we think it may not be unreasonable to select one or two portions as extracts; and these we shall endeavour to make as interesting as possible.

In the first division of the museum, or that devoted to preparations illustrating facts of healthy anatomy, we find some curious examples of deviation in position. The following is a very singular specimen of transposition of the heart and all the other organs which must be interesting to the physiological reader.

" B. *b.* 100. A rare specimen of transposition of the heart, and of all the other organs in the human body. The case was that of an elderly woman who died of fever in the Richmond Fever Hospital; she had been a woman of good constitution, and the mother of several children, but of whose history nothing could be learned. Respecting herself during lifetime, no remarkable circumstance had ever attracted attention, and it was only by accident in proceeding to an examination of the body after decease that the peculiarities of her frame were discovered.

" The cavities of the heart are completely transposed; those which customarily lie on the right side occupy in this instance a place on the left, and *vice versa,* those whose natural position is the left, are here found on the right. The pulmonary cavities of the heart are filled with blue, the systemic with red injection: the base of the heart looks upwards and to the left, the apex downwards and to the right, where its pulsation must have struck between the cartilages of the fifth and sixth ribs; the *vena cavæ,* though so far out of their usual place, are of the ordinary size, and formed by the common coalition of venous trunks. The pulmonic auricle and ventricle are here the left cavities, and the pulmonary artery in its course from the upper and right corner of the ventricle to its bifurcation near the roots of the lungs is placed along the right side of the arch of the aorta: the systemic auricle and ventricle are in this instance the right cavities: the aorta makes its arch to the right, and descends in the thorax along the right side of the vertebral column, and even in the abdomen down to its bifurcation in the iliacs, it holds the same unusual position. The inferior *vena cava* lies for its whole length to the left of the aorta, and in front of the bodies of the vertebræ. Three arteries arise as usual from the arch of the aorta, but the order in which the extremities receive from them the blood is reversed; the left arm and the corresponding side of the head are first supplied from the *arteria innominata;* the right side of the neck, and the right arm receive in succession the blood conveyed by the carotid and subclavian arteries, which have separate origins from the arch. The right *vena innominata* crosses above the arch of the aorta, and, joining the left at the left side of the *arteria innominata,* forms with it there the commencement of the *vena cava superior.*

" The œsophagus is placed along the posterior and right side of the trachea. The stomach is shown lying in the right hypochondrium, and the vessels which supplied the liver in the left. The cœcum occupies the left iliac fossa, and the sigmoid flexure lies in the right, terminating there in the rectum, the position of which, as regards the sacrum, is in accordance with the other irregularities. In making the dissection, it was noted that the misplacements of the spleen, pancreas, and other organs, were of the same character, and equally complete as those exhibited in the preparation.—J. H." —Pp. 61–62.

The museum contains in its first department of the second division several instances of the injury done to the stomach by swallowing sulphuric acid. Nos. 160, 161, 162, 163, and 164, are all examples of death produced by the immediate or the remote effects of this corrosive and cauterizing agent. The first three are the most important; and their nature may be known by the descriptions given in the catalogue.

" A. *b*. 160. A stomach showing the effects of sulphuric acid taken as a poison. The entire inner surface is uniformly of a blackish colour with a crimson tint. The mucous membrane hangs in shreds, some of which, about the cardiac orifice, are an inch long. Towards the pylorus, the surface has a velvety appearance. The peritoneum presents a dark, mottled surface. In the great extremity there is a rent, nearly two inches long, from the outside of which long shreds are seen to hang. Another perforation exists near the pylorus, surrounded by a thickened brownish patch; and about two inches from the latter, there is a dark, soft spot, but unbroken externally. The inner surface of the duodenum is dark coloured, but unbroken in texture. There is no history of this preparation. The poison must have been in large quantity.—*Surgeon Colville, Armagh.*

" A. *b*. 161. An instructive preparation, showing the effects of sulphuric acid on the stomach. The organ is large, and deeply rugated. The mucous membrane is traversed by numerous black, prominent ridges, from three to four lines in breadth, and about an inch apart from each other. These charred ridges, which to the finger feel like whip-cord, may be traced from the cuticular lining of the œsophagus, to within about three inches of the pylorus, where they disappear in a surface universally black and velvety. The ridges are broadest in the cardiac extremity, at which part, they are united by crossbands of the same character; they are also more soft, and spongy-looking here, than near the pylorus. They manifestly correspond to the projections of the rugæ—the parts which, in the contracted state of the stomach, must have come into most immediate contact with the acid. The peritoneal covering is entire and healthy looking. The duodenum is comparatively uninjured, though the mucous membrane is of a dark colour. The pyloric, and duodenal glands, are greatly increased in size. The acid was discoverable by chemical tests in the stomach, and through the whole tract of the small intestines; but, in quantity, increasing with the distance from the former. No trace of it could be found in the contents of the large intestines.

" The patient, a young woman, died in thirty-eight hours, after swallowing a large dose of sulphuric acid. The stomach-pump was early employed, and a quantity of the poison thereby extracted. No account of the symptoms preceding death has been communicated; they were most probably of the ordinary description.—*Professor MacNamara.*

" A. *b*. 162. A part of the inner coats of the stomach, discharged by vomiting on the sixth day after swallowing sulphuric acid. The firmness of the substance, and the presence on it of muscular fibres and blood-vessels, leave no doubt as to its being part of the organized textures of the stomach. Part of it is charred to blackness. The inner layers of the œsophagus were on the evening of the same day in like manner expelled. (See A. *a*. 43.)—History of the case. A female of 18, swallowed a large dose of sulphuric acid. In less than an hour she began to sink; had cold extremities, occasional vomiting, and intense burning pain in the epigastrium, and along the œsophagus, relieved in a great degree by pressure. There was a swelling at the fore-part of the neck, and difficult deglutition, from an early period. The introduction of a large catheter restored the power of swallowing. On the third day there was extreme debility, anxiety, and restlessness, with intermitting pulse, and some discharge of blood from the stomach. After this, until the sixth day, she appeared to improve; when, after an exacerbation, the parts exhibited in the preparation, were thrown up by vomiting, For many days after she appeared to be doing well, taking nutritious broths; but spitting up occasionally, flaky fragments. On the thirteenth day, the pulse was 90; abdomen bearing pressure; no vomiting. The cuticle of the tongue now exfoliated; previously its surface had been as white as milk; but subsequently to the separation of the cuticle, it became as red as scarlet. There was about this period much difficulty and pain in swallowing, the obstruction being referred to a point opposite the cricoid cartilage; some difficulty was experienced in the introduction of a bougie. On the twenty-fifth day there was considerable fever, pain in the side, and a pointing, as of an abscess, opposite the cricoid cartilage. On the thirty-third day she died of the irritative fever. Although the stomach is not preserved, it may be satisfactory to state the appearances observed in the *post mortem* examination. No peritonitis—stomach small and empty. Pyloric extremity apparently natural and sound, both inside and outside. Cardiac extremity smooth, reddish, and without villi, like the glazed surface of some hastily healed ulcers. About one-half of the stomach, an extent corresponding exactly to the amount of parts detached during life, was in this state. At one spot only, where a pit existed—the result no doubt of a deep loss of substance in the interior—the omentum adhered on the outside, so as to maintain the integrity of the organ. The intestines, though everywhere healthy, were much contracted. Connected with the posterior wall of the œsophagus, there existed an abscess, which extended from about the third dorsal vertebra, to the apex of the tumour in the neck. It was found that the instrument, on its last introduction to relieve the difficulty of swallowing, had perforated the thinned softened walls of the œsophagus high up, traversed the cavity of the abscess for some way, and re-entered the tube lower down, in such a manner, as finally to reach the stomach. Some of the matters attempted to be swallowed were found mixed with pus in the cavity of the abscess.—*Dr Corbet.*"—Pp. 28–31.

The department allotted to diseases of the bones is very extensive, and contains a great variety of instructive and valuable preparations. By far the most curious is the following history of a case of ankylosis of all the joints in the body, which has often been a subject of speculation with the curious and the lovers of the marvellous. We remember in the year 1831, in travelling through Westmoreland, meeting with two gentlemen who had just returned from the Isle of Man, where, if we remember right, they had seen and carefully examined this person, and were much struck with the great extent of the immobility of all the joints. The account in the present list may be relied on as perfectly authentic.

" E. *b*. 1021. A skeleton ankylosed in every joint of the body, with exception of some of the inter-phalangeal articulations, and of those of the lower jaw. From the occipito-altantoid joints down to the os sacrum, every vertebra is united, by bone, to its *fellow*. The head is perfectly immoveable on the spinal column,—even so far, as that the styloid process of the temporal bone is ankylosed to the transverse process of the first vertebra. The hip, the knee, the ankle-joints, together with those of both shoulders, both elbows and both wrists, are perfectly immoveable. The man, while living, was a perfect automaton. The nature of the ankylosis every where is the same. There does not appear to have been, in any joint, whatsoever, any premonitory or inflammatory action. The joints, and the bones forming them, have, as it were, been fused and run together, without unusual vital exertion of any kind. There is not, in any joint thus ankylosed, a single trace of osseous deposit, beyond the lines of apposition of the bones; neither is there the least displacement or disfiguration to be seen. The bones appear, rather, as if they had been joined together by some artificial cement, than as if an active, vital process had been at work in their amalgamation. Every bone is perfect, in form, and of good size; but, in weight, they are all deficient. When measured by the hand, the difference between them and healthy bones is very striking: the pelvis, for example, feels no heavier than a piece of paper. This man was exhibited, in Dublin, about five years before his decease: but, from his own apprehensions respecting a *post mortem*, he had himself removed back to his usual place of residence, the Isle of Man. He died there shortly after, but the immediate cause of his death cannot, now, be ascertained. His friends, to prevent his body from being disinterred, or, at all events, to have it given out that the body was useless for anatomical purposes, broke his bones into pieces with saws and sledges. These objects were, however, to a certain extent defeated, as demonstrated by the present exhibition.

"The following account of this individual, written in the year 1832, by Dr P. Lyons, of Brighton, conveys important information respecting his history. See Lancet, Vol. xxi. p. 27.

"Thomas Radcliffe, a mason, residing in the parish of Kirk Andreas, Isle of Man, aged 36, of healthy parents, always enjoying good health up to the time of his being afflicted with his present complaint, was seized about seven years and a-half ago with a dead and numbing pain in the right elbow-joint, which, though unaccompanied with redness or swelling, in a month completely deprived him of the use of it; an attempt made by a surgeon to extend the arm very much exasperated the complaint. In about three months after he was attacked in a similar manner in both knees. His sufferings were now constant and accompanied by a sense of constriction in the diseased joints, though none of them showed any external symptom of inflammation; he was blistered, and was ordered large doses of guiacum, with hot salt-water baths, but obtained no relief from those remedies. Being deprived of the use of his right arm, and advised to be blooded, he had about ℥xx. taken from his left arm; he instantly lost all power over the elbow-joint of that limb, and experienced the same pain in it as in the others; all the rest of his joints were now affected in succession, as also was the spine generally, and in a year and a quarter he was rendered unable to leave his bed or sit up; on being ask if he thought his complaint originated in cold, he replied he did not, as he had always enjoyed excellent health, even to the day when the disease first showed itself, and the preceding winter had been a particularly fine one. His sufferings continued about a year and a half, when they altogether ceased, except on the joints being moved. Present state; —Considerable emaciation; appetite good; bowels regular; great thirst, which is attributable to his constant perspiration; urine, which, when he was first taken ill, used to deposit copious quantities of a white earthy sediment, is at present of a natural colour, but rather scanty, sometimes red, but without any deposit; all his senses perfect except that of hearing. Has had two children since the commencement of his illness, the younger about a year and a-half old. The pulse at wrist seventy, soft and regular; beat of heart one hundred, small and regular, audible over left side of anterior portion of chest, slightly so on one side, aortal pulsation audible below umbilicus; respiration pure, but only slightly perceptible on anterior inferior portion of chest, distinctly so on superior; voice brazen, none of his joints in the slightest degree enlarged, and no ossific deposit to be detected in any muscular part of the body; head firmly drawn to the left side; slight command over superior cervical vertebræ, but none other; partial motion of lower jaw; larynx appears to be completely ossified, and, as it were, drawn down into the chest; sternum depressed, ribs flattened, and cartilages ossified; some elevatory power of right shoulder; complete ankylosis of right elbow in semiflexed position; wrist straight and prone; fingers flexed and immovable, except little one; left arm capable of being slightly raised; elbow fixed in bent posture; wrist and fingers fixed; thumb retains some slight power of flexion; partial motion of hip and ankle-joints."—Pp. 415—418.

In perusing the history of so extreme a case of ankylosis and consequent immobility as this, we are instantly led to lament the defects of human knowledge, and are especially impressed with the mortifying fact, that, though morbid anatomy shows the effects of diseased action, it often throws little or no light on the causes of that action. Here is an instance in which every joint almost had been rendered immovable, where there had been no mark of previous inflammatory action, and in which all the bones appear as if united, as Dr Houston expresses it, by some artificial cement, rather than by the products of inflammation, as they usually are, and all deficient in weight; yet in neither the effects of which, nor the history of the approach of the symptoms, nor the state of the man between the date of the commencement of this affliction and the period of decease, can any circumstances be discovered which tend to throw light on the origin or cause of this malady.

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## ART. VI.—*The Physiology of Vision.* By WILLIAM MACKENZIE, M. D., Surgeon-Oculist in Scotland in Ordinary to her Majesty the Queen, Lecturer on the Eye in the University of Glasgow, and one of the Surgeons to the Glasgow Eye Infirmary. London, 1841, 8vo. pp. 292.

THE explanation of the properties and uses of the different parts composing the eye affords so beautiful an example of mechanism and the adaptation of mechanical laws to vital purposes, that it has at all times engrossed a large share of the attention both of mathematicians, natural philosophers, and oculists. Hence, we find that in the writings of each class, more or less is explained of the phenomena and mechanism of vision, and the properties and uses of the different transparent parts of the eye-ball. From this circumstance in the nature of the subject, it is often requisite for the student who wishes to have a thorough knowledge of all its divisions, to study it not only in the writings of physiologists but in the works of writers on optics and physics. From the same circumstance also it results that, though the general facts of the phenomena of vision, and the laws by which they are regulated, have been long known and embodied with the general and particular doctrines of physical and physiological science, yet, from time to time, facts are modified, new points are brought to light, new principles and explanations are suggested, and the whole subject is receiving new elucidation. It is a mistaken view to suppose that any department of science is so completely cultivated and known, as to render discovery impracticable, or that, in the progress of knowledge, we are so far advanced as to become necessarily stationary.

In the subject of the physiology of vision, many new views have been given, and not a few curious facts have been brought to light during the last 25 or 30 years. The curious set of facts illustrating the polarization of light has contributed greatly to direct attention to this subject, and has been the means of educing many new views and explaining what was formerly difficult to understand; and the united and successive labours of Young, Brewster, and Wheatstone, have been of essential service in the general elucidation of the inquiry. In the present volume the author professes to give, in as condensed a form as possible, all the facts necessary to illustrate the phenomena of vision, and the powers and properties of the eye as an optical instrument. This task he has accomplished in a skilful and agreeable manner. It is not our intention to enter into any critical examination of the work, though we can assure our readers that its merits are such as to endure this ordeal with great facility. But, to give an idea of the mode in which the author treats his subject, and the large amount and variety of information communicated, we shall merely give a summary of its contents.

The work consists of twenty chapters, each of which is subdivided into sections devoted to the consideration of different branches of the same subject.

The first chapter consists of introductory observations on the function of vision, on the eye as an optical instrument, on the laws of light, and some general facts regarding reflection and refraction.

The second chapter is devoted to the rectilineal progression of light, and the formation of images by radiation. In the third chapter, the author treats of the refraction of light, its varieties, and the laws by which it is regulated. The fourth chapter is devoted to the measurement of refraction; the fifth to the application of the law of refraction; the sixth to the forms of refractive media, and the effects on the direction of the rays of light; and the seventh to the refractive powers of the lenses of the human eye. In the eighth chapter, the eye is considered as a dioptric instrument; in the ninth, optical aberration, spherical aberration, and the corrections requisite to counteract its errors, are examined; in the tenth, chromatic aberration, and the achromatic properties of the eye; and in the eleventh, distantial aberration, and the accommodation of the eye to distances are discussed. The last chapter is very elaborate, and presents an ample and detailed view of this question, which is encompassed by a number of difficulties.

In the chapters now enumerated, the author has had occasion to look on the eye chiefly as an instrument consisting of different diaphanous textures, which transmit light, but, at the same time, act in refracting it, and otherwise modifying its motions, while these are more or less acted on by the luminous rays. In the succeeding chapter, which is the twelfth, the functions of the iris and the motions of the pupil, are described and considered. In the thirteenth chapter, the reflection of light by the eye; and in the fourteenth, its absorption by that organ, with the functions of the choroid coat and black pigment, are examined. The fifteenth is devoted to the functions of the retina and optic nerve; the sixteenth to monocular and binocular vision and single vision with two eyes; the seventeenth to the colours of objects and complementary colours, and ocular spectra; and the eighteenth to the visual perceptions of figure, place, magnitude, distance, and motion.

In the nineteenth chapter, entitled vision aided by art, the theory and mechanism of catoptrical and dioptrical instruments is considered and explained; and in the twentieth or last chapter, on the improvableness of vision, the author considers the circumstances which improve the eye, and those which have a contrary effect, and examines the distinction drawn by Herschel between the power possessed by telescopes of magnifying objects, and their alleged property of penetrating into space.

This is, in short, an excellent and instructive, and rather interesting work on the physiology of vision.

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## Art. VII.—*The Surgeon's Vade-Mecum.* By Robert Druitt. Second edition. Illustrated with fifty wood-engravings. London, 1841, 12mo. pp. 524.

This is one of the best manuals on surgery which we have seen. Originally published in 1839 on a smaller scale, but similar plan, it has now gone to a second edition; and in the present day, when the taste for manuals, vade-mecums, and such small ware is strong and general, we may justly pronounce this to be one of the best specimens of the tribe. The author has contrived to introduce a large proportion of sound scientific information in the two first parts, which are devoted to the elucidation of Surgical Pathology. And in the subsequent parts, where he treats of wounds, diseases, and injuries and operations, he has given clear and correct descriptions. The work is illustrated by very correct and beautiful engravings, a considerable number of which are the same as those in Mr Liston's Practical Surgery. This is, in short, an admirable guide to the student in surgery.

# PART III.

## MEDICAL INTELLIGENCE.

### ORGANIC CHEMISTRY.

*On the Composition and Identity of Albumen and of Fibrine.* By M. Liebig. (*Gazette Mèdicale de Paris,* 3d April 1841.)—M. Liebig, in a letter to M. Denis, confirmed the results of that gentleman's experiments as to their identity and also as to their composition.

M. Liebig succeeded in dissolving entirely pure fibrine in a saturated solution of nitre, keeping them in contact at a temperature varying from 122° to 132° Fahr. The fibrine became at first gelatiniform, and only left a very few insoluble flakes. The filtered liquid possessed all the properties of albumen. The composition of the dissolved fibrine, thus changed into liquid albumen, was precisely the same as ordinary fibrine and albumen The formula $C^{48} H^{74} N^{14} O^{11}$ expresses the relative proportion of elements.

M. Liebig also succeeded in precipitating albumen in the form of globules, by adding a sufficiency of water to the serum rendered neutral by an acid; he also extracted blood globules from the fibrine by the process of M. Denis.

Lastly, by first adding to albumen a little caustic potash, M. Liebig precipitated it under the form and with the properties of casein, by adding alcohol.

### MORBID ANATOMY AND MEDICAL PATHOLOGY.

*Case of Apoplectic Effusion in the Tuber Annulare.* By M. Mahat. (*Archives Generales de Medecine,* January 1841.)—A young man of 25 years of age, after complaining for a few days of a feeling of heaviness and slight headach, perceived a numbness in his left arm, which, however, did not prevent him following his occupation as usual. In the evening he was suddenly seized with giddiness and paralysis of the left side of the body, and fell to the ground; he did not, however, altogether lose consciousness, but the articulation of sounds was lost. When taken to the hospital twenty-four hours afterwards, it was ascertained that there was complete insensibility of the limbs on the left side of the body, and the patient could scarcely command the slightest motion in them. The commissure of the lips was drawn to the left side, and the tongue, when thrust out of the mouth, pointed to the same side. He could not close the right eyelid, and the pupil of that eye was much more contracted than that of the left. The paralysis progressively diminished till about the tenth day, when cramps and sensations of formication began to be experienced in the affected limbs, with ringing in the left ear. Delirium soon after came on; the left arm was attacked with erysipelas and serous infiltrations, and he died about forty days after the accident.

Within the substance of the *tuber annulare,* on its right half, but passing a little beyond the median line, towards the left side, was found an abscess of about the size of a chestnut. It was well circumscribed, and the surrounding substance presented its ordinary firmness and colour. The left ventricle of the heart was considerably hypertrophied.

*Case of Tumour of the Brain, with Hydrocephalus, and arrest of Developement of the Uterine System.* By Dr O'Bryen. (*Dublin Journal of Medical Science*, January 1841.)—Mary Morgan, aged 20, when about two years of age, had an acute attack of hydrocephalus, which appeared to continue in a chronic form during the rest of her life. At the age of seven, during another attack, she lost the sight of her left eye. When about fourteen years of age, the fits to which she was subject became more severe, and of longer duration; and when about eighteen, after feverish symptoms, and an epileptic fit, which lasted two hours, with slight delirium, the right side became paralysed. About four months before her death she frequently slept for a whole week, during which she suffered from convulsions every four or five hours. The power of speech, which had been gradually becoming more imperfect, was lost for some days before her death, as was also the power of swallowing; she also partially lost the use of the right eye. She died when about twenty years of age. The expression of her countenance was very childish. Menstruation never appeared; nor did any change take place in her manners or habits, as is usual at this period of female life. She showed no preference for the society of the male sex, but rather shunned them, preferring the toys of childhood, and children of five or six years old for her playmates.

The *dura mater* was thickened, white, and extremely resistant. The arachnoid was thickened, and of a milky whiteness. The convolutions of the brain were almost obliterated, and the substance softened. After removing a slice of about half an inch from the hemispheres, the lining membranes of the lateral ventricles were brought into view. They were white, tense, very resistant, and distended with serous fluid. When the serous fluid, which was about eighteen ounces in quantity, had escaped, the brain lost its round appearance, and became flattened. When the ventricles were laid open, a tumour was found arising from the anterior part of the left optic thalamus covered by the lining membrane of the ventricles, which it had pushed before it. When the brain was removed, a second branch of the same tumour was found extending along the petrous portion of the temporal bone, penetrating the *tentorium cerebelli* above the internal auditory foramen, and adhering firmly to the arachnoid covering the left lobe of the cerebellum. The tumour was composed of calcareous matter; and measured from its base upwards of two inches, and from its base to the end of its lateral branch, two inches and a quarter, varying from half to one inch in breadth. Near the base of the tumour was a notch, under which the third, fourth, and sixth cerebral nerves, with the first branch of the fifth pair passed. The base of the brain presented a loss of substance corresponding to the size of the tumour, commencing to the right of the *tuber annulare*, which was sound, including a fourth of an inch of the *crus cerebri*, two convolutions of the middle lobe, to the depth of nearly one inch, on the outside leaving the fifth pair of nerves, and on the inside the *corpora albicantia* untouched. The tumour then penetrated the left optic thalamus, destroyed a part of the *corpus striatum*, the left optic nerve posterior to its commissure, and the first pair of nerves at their origin. The pineal gland could not be found. On inspecting the base of the cranium, the left anterior and posterior clinoid processes were found absorbed; and the tumour, with a narrow base, was found adherent to that portion of the membrane lining the *dura mater*, which covers the left carotid artery after it enters the cranium.

The cerebellum was the only part of the cerebral mass which appeared to be perfectly healthy, if the adhesion of its membranes to the tumour be excepted.

Nothing unusual was met with in the thoracic and abdominal viscera, with the exception of the left lobe of the liver, which was nearly as large as the right. The uterus existed only in miniature; it measured only one inch in length, one line and a-half in thickness, and four lines in breadth. The ovaries were each about the size of an almond, and when divided presented one or two cavities. The Fallopian tubes were well formed, but their openings into the uterus were much larger than usual. The *os tincæ* were about the size of a small pea, and very soft. The vagina was small, and had very few rugæ. No hair existed on the pubes, and the mammæ were not developed.

The above case appears to be worthy of notice from two circumstances connected with it; *first*, that the destruction of the left optic nerve posterior to the commissure was followed by loss of vision of the left eye, whilst the humours retained their transparency; and *secondly*, that though the generative organs presented not the smallest developement, the cerebellum was not involved in the disease, but appeared perfectly healthy.

*Extraordinary Developement of the Kidneys in a New-Born Infant.* By Dr F. Oesterlen of Murrhardt. (*Neue Zeitschrift fur Geburtskunde.* August 1840.)—The great size of the abdomen of the infant formed a serious obstacle to its delivery; the head and breast passed the vulva easily, but it required considerable efforts on the part both of mother and accoucheur to deliver the abdomen. The child was dead, and the enlargement of the abdomen was found to depend on an enormous developement of the kidneys, which had displaced the liver and all the other abdominal viscera. They were converted into a vesicular structure, and the granular portions were considerably enlarged. The vesicles were regarded as true hydatids, into which the parenchyma of the kidneys had been transformed.

This disease, though rare in the young of the human subject, is not at all uncommon in lambs.

*On the influence of Venereal Excesses in the production of Apoplexy.* By Dr Muynch. (*Annales de la Societé de Medecine de Gand*, January 1841.) —Dr Muynch has in many instances traced apoplectic attacks to venereal excesses. He supposes that they first augment the irritability of the brain, but, in consequence of their continuance, soon induce a state of permanent debility, and diminution of the tonic and cohesive power of the nervous system; and that the weakness caused by these seminal losses is of a much more severe nature, and more permanent, than even repeated blood-lettings carried the length of producing cerebral anæmia.

The signs which precede the apoplectic attacks are in general loss of the intellectual faculties to a greater or lesser extent, loss of memory, incompetence for any continued mental exertion, in addition to the loss of the general health. Convulsive movements of the muscles of the arms and face are often remarked, and a state of mind approaching idiocy or insanity.

When the apoplectic seizure is traceable to this cause, bleeding is highly injurious. The remedies recommended are quinine and other tonics, valerian, arnica, carbonate of ammonia, &c. together with frictions alongst the vertebral column with some stimulant liniment.

*Singular circumstance regarding Lactation.* By M. Audebert. (*Journal de la Societé de Medecine Pratique de Montpelier*, December 1840.)—A lady, 62 years of age, on account of the ill health of her daughter, who had been recently delivered of a female child, undertook to nurse it. To quiet the infant she occasionally put it to her breasts, when, to her astonishment, after a time, she perceived them fill with milk, which appeared of good quality and in all respects natural. She suckled the child for upwards of one year, and two months after the child was weaned the secretion of milk still continued to a small extent About this time her daughter was delivered of another child, to which she again became wet nurse. Twenty-seven years had elapsed from the time when this lady had her last child, and acted wet-nurse to her grandchild; her mother bore a child when 63 years of age.

*On the advantage of keeping the Umbilical Cord whole for some short time after birth.* By M. Baudelocque. (*Comptes Rendus de l'Academie des Sciences*, 8th March 1841.)—In all cases where the infant is born weakly or in a state of asphyxia, M. Baudelocque recommends not to cut the umbilical cord for some time at least after birth. He relates that since he has followed the opinions of Smellie, Levret, Chaussier, &c. on this subject, he has not lost a single case, although when born the child might be in a state of pretty complete asphyxia or apoplexy. He states that, though a child be born in an apoplectic or asphyxiated state, the circulation still continues through the umbilical vein, even though the umbilical arteries should have ceased to beat, and that premature section of the umbilical cord takes away one of the chief aids to its revival.

*Case of General Emphysema caused by an Ulcer of the Larynx.* By M. Boddaut. (*Annales de la Societé de Medecine de Gand.* August 1840.)—A girl about 15 years of age had for some time been affected with pain in the throat, difficulty in swallowing, and general ill health. On the 20th of March, the pain of the throat had become very severe; she could not swallow any solid food, and the jaws could not be separated but with difficulty. On the night of the 22d, emphysematous swelling appeared on the neck and the right side of the face, and as the girl was much frightened, and cried abundantly, the swelling rapidly increased over the other parts of the body. By the 24th, the emphysematous swelling had involved the whole of the face, neck, trunk, and upper extremities, but had not extended to the lower; the palms of the hands being alone exempt from it. She died on the night of the 24th.

No lesion was observed in the lungs. The right ventricle of the heart was gorged with frothy blood. When the larynx and trachea were laid open, a small round ulcer, pierced in its centre by an opening similar to what a lead drop would have produced, was noticed in the right ventricle of the larynx, a little below the vocal cord. Four or five superficial, but not distinctly circumscribed ulcers were observed in the pharynx.

*Scurvy apparently produced by eating Haricot Beans.* By M. Collineau. (*Gazette Medicale de Paris*, 27th February 1841.)—In the prison at Clairvaux, at the period when the potato begins to germinate, it is stopped as an article of food for the prisoners, and haricot beans are substituted in its stead. Whether from this cause alone, or others necessarily dependent on confinement, true it is, that at this period a severe epidemic scurvy has prevailed amongst the prisoners, which could not be attributed to any other apparent cause. The physician of the prison suggested the cooking of the haricot beans in wine, instead of their usual mode of preparation—a change which produced the most happy results, for under their use thus dressed the disease disappeared. M. Collineau is of opinion that the wine acted beneficially by rendering these legumes more digestible, an opinion which is corroborated by the fact, that this disease appears in many cases to arise from a deficient supply of nutriment, and that the bean appears to be difficult of digestion to those unaccustomed to its use. The wine might therefore prove beneficial in two ways; first, by increasing the digestibility of the legume, and secondly, by acting as a stimulus to the digestive organs.

*Remarkable effects of Rheumatism.* By Dr Washington. (*New York Journal of Medicine and Surgery,* January 1841.)—A young man, 19 years of age, had been a martyr to rheumatism for ten years. His knee-joints are dislocated, so that the condyles of the femur are anterior to the head of the tibia; the bones of the spine are ankylosed; the chin is fixed within two finger's breadth of the top of the sternum, so that he cannot move the head without moving the whole body, the union of the bony surfaces being apparently perfect. There is great emaciation of the whole system, but particularly of the limbs, so that his thigh is not larger than the wrist of an ordinary sized man. There is at present active disease in both wrists, which are tender, and have a doughy feel. The sight of the right eye has been destroyed by iritis, and the pupil of the left eye is so contracted from the effects of the same disease, as to prevent his reading. His digestive organs appeared to be in a healthy state, though his tongue was slightly furred. He is of a cheerful disposition, and continued to read so long as the state of his eyes permitted.

## MEDICAL THERAPEUTICS.

*On Compression of the Carotid Arteries as a remedial means in convulsive diseases.* By M. STROEHLIN. (*Journal des Connaissances Medico-Chirurgicales,* October 1840.)—Compression of the carotid arteries for the relief of convulsive diseases, though recommended strongly in 1789 and 1792 by Dr Caleb Hillier Parry, (Memoirs of Medical Society, Vol. iii. p. 77,) and much practised by that gentleman and his friends, has apparently fallen so much out of use, or is so little known, that M. Stroehlin has been induced to publish the result of a number of successful cases treated by him in this manner. Fits of epilepsy, of convulsions, and of hysteria, are the diseases which are more particularly mentioned, and in these it was found that compression of the carotid arteries in most instances put an end to the fit. When convulsive paroxysms were confined to one-half of the body it was found sufficient to compress the carotid artery of the opposite side, but when the whole body was affected, both required to be compressed. When mentioning epilepsy, he states that Boileau effected a complete cure in one case by putting a ligature around one of the carotid arteries which had been wounded; and a similar case occurred in the practice of a surgeon at Calcutta. M. Stroehlin seems here to allude to the cases given by Mr J. R. Preston, already mentioned in our 43d vol. p. 485.

*On the Protiodide of Iron, and its efficacy in curing Pulmonary Consumption.* By Dr ALPHONSE DUPASQUIER. (*Journal de Pharmacie.* March 1841.)—When pulmonary consumption has arrived at its last stage, when caverns exist in the substance of the lung, it has been generally regarded as incurable. Dr A. Dupasquier, however, from six years' experience of the efficacy of the administration of the protiodide of iron at this stage of the complaint, has arrived at the conclusion, that it may be occasionally got the better of, and a cure be effected. He does not, however, like many discoverers of new remedies, claim for this medicine the title of a specific in consumption, but only recommends it as "a remedy infinitely more useful than any which has been hitherto employed in this disease." Sometimes, he says, the protiodide of iron has no action whatever, or its action is only temporary. At other times it produces considerable amendment of all the symptoms, restores hope to the patient, and smooths considerably the way to death. Pretty often it produces temporary cures; and sometimes, but more rarely, perfect cures; giving rise to complete cicatrization and filling up of the caverns in the lungs, even in patients arrived at the last stages of marasmus, restoring to them their original stoutness, and all the usual marks of health.

Much of his paper is taken up in criticising the various preparations of the protiodide of iron prepared in France, which all appear to have contained an excess of free iodine, which rendered them too stimulating in his complaint, and actually injurious. None of his remarks apply to the reparation used in this country, which possesses all the requisites of purity in even a greater degree than that proposed by Dr A. Dupasquier himself. He directs the protiodide of iron to be kept in solution, and its strength, as estimated by the quantity of iodine contained in a certain quantity of water, is as 1 of iodine to 8 of water. The solution in the Edinburgh Pharmacopœia is very nearly as 1 iodine to 14 water. Of this solution he directs from 15 to 60 minims to be taken daily in syrup of orange flowers, carbonic acid water, marmalade, &c., and to persevere in its administration, even though diarrhœa or slight gastric irritation should be produced. He says it is only necessary to suspend its employment when sensations of suffocation become strongly developed.

*On the danger of applying Leeches to the Scrotum.* By M. Tavignot. (*L'Experience*, December 1840.)—M. Tavignot relates three cases where inflammation, suppuration, and gangrene, causing death in two of the patients, resulted from applying leeches to the scrotum. In cases where it is considered necessary to detract blood locally from the scrotum, he recommends the leeches to be always applied to the inguinal region, and never to the scrotum itself, as the danger of inflammation in that part appears to be so great. From the description of the symptoms, it would appear that the leech-bites were followed by phlegmonous erysipelas, which rapidly destroyed the texture of the parts, and terminated in gangrene.

*On the best mode of treating Dropsy of the Subcutaneous Bursæ Mucosæ.* By Dr Jules Roux. (*Gazette Medicale de Paris*, 9th January 1841.)—Dr Roux, who has had an opportunity of treating a large number of cases of dropsy of the subcutaneous *bursæ mucosæ*,—a disease which was common in the sailors on board of the Montebello frigate, considers the application of blisters as by the far most efficacious plan of treatment. He had tried all the other more usual modes of treatment, but found this the most effectual, the most rapid, and the one least apt to be followed by a relapse.

*Experiments on Re-vaccination with New Virus.* By Dr T. S. Kirkbride. (*American Journal of the Medical Sciences*, January 1841.)—The new virus was procured from Professor Dunglison, who had obtained it from England, and was eighteen and nineteen removes from the cow. 209 children were vaccinated with this matter; and upon some part of the limbs of all of these perfectly formed, rounded, stellated, or punctated cicatrices of a former vaccination were found. Their ages averaged 12 years; the youngest being six, and the oldest twenty years old. Of the 209 only 44 took the vaccine disease perfectly, and presented precisely the same characters as in those who had been vaccinated for the first time. This virus produced sloughing and ulceration on the arm, which it required several weeks to heal. The scabs alone were used for the vaccinations, being found more efficacious than the recent lymph, and it is stated that the recent lymph is very rarely used in America. Two or three cases which had small-pox in infancy took the cow-pox on being vaccinated; but ten who were deeply pitted with small-pox resisted it. Five children who had been several times attempted to be vaccinated with the old virus resisted the new virus also.

It is stated that the local and general symptoms produced by the new virus were thought to be more severe than those produced by the old virus, and that the prophylactic powers were greater; but no evidence is adduced of this being the fact.

## SURGICAL PATHOLOGY AND THERAPEUTICS.

*On the Cause and Surgical Treatment of Myopia.* By Dr Jules Guerin. (*Gazette Medicale de Paris*, 20th March 1841.)—Dr Jules Guerin recognizes two varieties of myopia, which he denominates mechanical myopia and optic myopia; the first depending on a contracted or rigid state of the recti muscles of the eye, which alters its form. This mechanical myopia is sometimes produced by the contraction of the whole of the four recti muscles or only by three, or even two of them, and is often attended with strabismus, which seems to depend on the unequal contraction of one of the recti muscles. This variety of myopia is said to be easily recognized by the altered form and peculiar movements of the eyeball. The anterior half of the globe of the eye is conical, the cornea representing a segment of a much smaller circle than that of the rest of the globe. The lateral portions of the eyeball are depressed and flattened in the situation of the recti muscles affected, and the movements of the eyeball are more or less circumscribed according to the muscles which are shortened.

The treatment consists in the subconjunctival section of the muscles which are shortened or retracted. Dr Jules Guerin has several times performed this operation for the cure of the mechanical myopia both when it has existed as the only disease, and when it has been complicated with strabismus. He instances two cases where the individuals before the operation could only read with glasses, the one with glasses No 3, the other No. 11; but who three days after the operation could read distinctly without glasses at the distance of more than a foot, and see objects clearly at many yards distance. It is mentioned that some time elapsed before the eye acquired the ready faculty of accommodating itself to objects at different distances.

Dr Guerin is of opinion that this fact demonstrates clearly that the crystalline lens does not change its form when the eye accommodates itself to objects at different distances; but that it only changes its relation to the transparent cornea and the retina, to or from which it alternately advances or recedes.

*Reduction of a Strangulated Hernia, apparently effected by Acupuncture.* By Dr Daser. (*Journal fur Chirurgie und Augenheilkunde.* Vol. 30, 1840.) —A man, 50 years of age, was seized with strangulated hernia, with vomiting of stercoral matter, and all the other usual symptoms. The taxis having failed, Dr Daser, before having recourse to the operation for strangulated hernia, with the view of trying the effect of acupuncture, for the purpose of evacuating the gaseous contents of the strangulated portion of intestine, made two punctures in it with a long fine needle. No gaseous matters apparently escaped, but the patient complained of acute pain, and loud gurgling sounds were heard in the abdomen, immediately after which the hernia was spontaneously reduced. Dr Daser attributed this fortunate occurrence to the prick of the needle having excited the contractility of the intestine, causing it to contract on its contents, expel the gaseous matter into the abdominal portions of the gut, and thus facilitate its reduction

*Hemorrhage after Lithotomy stopped by Creosote.* By Dr Daser. (*Journal fur Chirurgie und Augenheilkunde.* Vol. 30, 1840.)—In a case of lithotomy it was found impossible to arrest the hæmorrhage by any of the usual means, and no particular vessel could be discovered from which the blood might flow. The patient was at last reduced to the lowest ebb from the continued loss, and had already lost consciousness, when a sponge dipped in pure creosote was introduced into the wound, and pressed against the bleeding parts for an instant or two. The hæmorrhage was immediately arrested. No particular pain was experienced, no unpleasant symptoms followed: thin eschars were thrown off, and the patient recovered.

## TOXICOLOGY.

*Case of Poisoning by Tincture of Cantharides.* By J. C. Cheesman, M. D. (*New York Journal of Medicine and Surgery*, January 1841.)— A woman who had been admitted to the hospital on account of a wound of the labium, was ordered to take ten drops of the tincture of cantharides three times daily, to relieve the inability she felt to pass her urine. This was on the 12th of November, and it was discovered next morning by half-past six o'clock, that she had, about mid-day of the 12th, swallowed the whole quantity ordered, as she thought it would cure her sooner. It was remarked by several persons in the ward, that, during that afternoon, she appeared as if intoxicated or crazy. Her condition in the morning of the 13th was as follows:. Excruciating pain was felt over the whole abdomen, which was increased on pressure; the pain, however, was most severe over the hypogastric region and *scorbiculus cordis*. The abdomen was swollen to the size of that of a woman at the full period of utero-gestation, tense and tympanitic. The pulse was not much accelerated; the tongue was pale and dry; the face flushed, and the expression anxious. During the night she had passed about a pint and a half of urine, which was mixed with organised lymph, and a substance resembling what is called mother of vinegar. A pill consisting of one grain of opium and two of camphor was administered every hour; flax-seed tea for drink; and the hip-bath.

At 6 P. M., she was very feeble; the pain in the abdomen was still more severe than in the morning; the pulse was scarcely perceptible, and the extremities were cold. Hot bottles were applied to the feet, and hot fomentations to the abdomen.

At 11 P. M. her pulse had become fuller, and as the pain still continued severe, twenty leeches were applied to the hypogastric region, and afterwards a large poultice; the urine was drawn off with a catheter; and the camphor and opium pills were continued throughout the night.

On the 14th she was delirious. The swelling of the abdomen had somewhat diminished, and the pain, which had abated, was not increased on pressure. During the night she had passed some urine naturally. By the evening the delirium had disappeared, and she complained only of pain in the region of the kidneys and bladder. Twenty drops of solution of morphia were ordered.

The pain and uneasiness after this continued to subside, and by the 27th had entirely disappeared, together with all other unpleasant symptoms; and on this day she was discharged at her own request, though her urine had still to be drawn off with the catheter.

*Medico-legal researches on Arsenic.* By MM. Flandin and Danger. (*Comptes Rendus des Seances de l'Academie Royale des Sciences*, 15th February 1841.)—These experimentalists have arrived at the conclusion, that arsenic does not exist naturally in the human body when in its normal state, and that the spots or stains obtained by means of the apparatus of Marsh are nothing else than a compound of sulphite and phosphite of ammonia, in union with organic matters formed during the carbonization of the animal matters.

With the view of definitely settling the question as to the presence of arsenic in the body when in its normal state, MM. Flandin and Danger operated in a different way from that usually followed. They carbonized the animal matters in close vessels, and collected all the products of the destructive distillation. But after the most careful examination of all the products, they could not detect the smallest trace of arsenic. They then poisoned several animals with arsenic, and examined their bodies, using the apparatus of Marsh, in order to determine whether there was any possibility of distinguishing between the true and the false arsenical stains or spots; and the result of their investigation was, that all the usual tests failed in most cases to decide as to which was the true, which the false. The only certain criterion proved to be the reducing the white spots to the metallic state. To effect this, they invented a new apparatus, which they intended to be annexed to that of Marsh.

This apparatus consists, 1. of a cylindrical condenser, having at its lower extremity a tubulature, and terminating in a conical extremity, which remains open; 2. of a tube for combustion, bent in its middle at a right angle, and fitted to the tubulature of the condenser by means of a cork; and 3. of a refrigeratory, the lower part of which is fitted accurately to the conical extremity of the condenser. When this apparatus is made use of, the refrigeratory is filled with distilled water and fixed into the condenser, the tube for combustion is then introduced to about a third from the extremity, and the jet of hydrogen, which is disengaged from the apparatus of Marsh, set fire to before anything but pure hydrogen is disengaged. The suspected liquids are then introduced into the flask of Marsh's apparatus, and the only care requisite is to maintain the jet of flame as small as possible. When the apparatus is properly adjusted it is found that part of the arsenic is condensed in the form of arsenious acid in the tube of combustion; another portion carried forwards by the watery vapour condenses on the sides of the refrigeratory, and runs from it into the condenser. The opening at the lower extremity of the condenser allows the operator, by removing the refrigeratory, to collect the watery product at any stage of the operation. When the experiment is concluded, the concrete arsenious acid in the tube of combustion ought to be used for the purpose of procuring metallic arsenic, whilst the watery product allows of the usual fluid tests being applied. By means of this apparatus arsenious acid and metallic arsenic, appreciable even to weight, may be obtained by operating on 12½ drachms of the liver of the lungs of dogs poisoned by 2¾ grains of arsenious acid. The conclusions which MM. Danger and Flandin draw from their experiments are the following:

1. Arsenic does not exist in the human body in its normal condition.

2. There forms, during the act of carbonization of animal matters, a product soluble in water, and capable of being sublimed, composed chiefly of sulphite and phosphite of ammonia, united to organic matter,—a product which is capable of furnishing with the apparatus of Marsh, spots, which present to a certain extent the physical characters of arsenic, and which gives most of the chemical reactions peculiar to that substance.

3. To avoid all fallacy in a case of suspected poisoning by arsenic, if the apparatus of Marsh is used, no reliance ought to be placed on the results obtained, unless the arseniuretted hydrogen gas is burned, and the products of this combustion tested.

4. In a case of poisoning by arsenic, the feculent and vomited matters ought especially to be examined if the person still lives; but if death has been the immediate effect of the poisoning, the arsenic may be found even in the most distant organs of the body.

*Arsenic not a natural Constituent of Human Bones.* By Dr G. O. Rees. (*Guy's Hospital Reports,* April 1841.)—The statement of Orfila, that arsenic exists in small quantity as a necessary constituent of human bones, induced Dr Rees to repeat his experiments, for the purpose of ascertaining how far they bore out his assertions. Dr Rees found, that, by following the same process, instead of obtaining metallic arsenic on the test plate, he only got an opaque white crust, which at first sight might have been mistaken for arsenic, but which, on further examination, proved to be nothing but phosphate of lime. When this crust was tested with nitrate of silver, and then exposed to the fumes of ammonia, yellow phosphate of silver was deposited, exactly resembling the arsenite of silver in appearance; so that if the crust were tested thus alone it might induce the belief that arsenic was present, though in reality there was none.

Dr Rees also remarked that the sulphate of zinc was sometimes thrown upon the test plate, and that, when this was in considerable quantity, it resembled the arsenious crust; and more so, when a drop of water was added to the test plate to dissolve the crust, and the ammoniacal nitrate of silver applied as a test, the oxide of zinc was deposited in a faint white cloud, resembling the arsenite of silver when in small quantity, and before it collects and shows its yellow colour.

Dr Rees next made some comparative experiments to ascertain whether the test by sulphuretted hydrogen, or that by the apparatus of Marsh was the more delicate of the two, and he "satisfactorily ascertained that a liquor which failed to yield any reaction whatever by Marsh's test could be rendered yellow by saturation with sulphuretted hydrogen gas; and that, from a quantity of such fluid equal to that required for the use of the reduction apparatus, a yellow precipitate could be obtained by boiling, in sufficient bulk to show its characteristic reaction of solubility in ammonia."

The test of sulphuretted hydrogen was therefore employed for the detection of any arsenic which might exist in the human bones, but after the most careful analysis none was detected. The process was the following: 7000 grains of the finely powdered ash of human bones were mixed with six ounces of pure sulphuric acid, diluted with as much distilled water as to bring the mixture to the consistence of a syrup. This was allowed to digest for several days, and then boiled, filtered, and washed. The clear fluid obtained was evaporated till a tendency to crystallize was observed. During this evaporation a yellow colour was produced, owing to the action of the sulphuric acid on the carbon of the bones. Sulphuretted hydrogen gas was then transmitted through the liquor to saturation, when the yellow colour disappeared and a dark-coloured precipitate was produced. When allowed to stand for some time a black crisp-looking precipitate collected at the bottom of the vessel, which on examination proved to be carbon with a small quantity of adherent phosphate of lime. It was tested in Marsh's apparatus, but no indications of arsenic could be detected. The filtered liquid was now boiled briskly until it ceased to give out the smell of sulphuretted hydrogen, and was set aside for 48 hours, by which time a crystallization of perfectly white calcareous salts was observed at the bottom of the vessel. No yellow tint, however, was discernible when this precipitated matter was examined by transmitted or reflected light. The liquid was next tested by Marsh's apparatus, without any indication of the presence of arsenic being observed.

Dr Rees mentions a very serious adulteration which occurs in some of the commercial sulphuric acid. On analyzing one specimen he found that in a pint of the sulphuric acid there were no fewer than twenty-two grains of arsenious acid. He recommends, in all experiments for detecting the presence of arsenic, the whole quantity of acid to be used should be tested previously by means of sulphuretted hydrogen gas.

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*Case in which Opium mixed with Sugar of Lead, in large quantity, was swallowed with impunity.* By Gurdon Buck, M. D. (*New York Journal of Medicine and Surgery,* October 1840.)—A seaman, under treatment for a carious ulcer near the lower part of the thigh, was seized with slight erysipelatous inflammation around the sore, for which the house surgeon prescribed an opiate lotion, to be made from thirty grains of opium and sixteen grains of sugar of lead. The patient, mistaking the directions, swallowed these substances in their dry state, about 8 o'clock on the evening of January 26th. About midnight he began to feel unwell, and thought he vomited a part of the powder. He did not rest well that night, but no symptom of narcotism followed, and on the following morning he was as comfortable as usual, and unaware that any thing had gone amiss.

An instance somewhat similar happened in the hospital in the summer of 1837. A patient swallowed, by mistake, a drachm of opium mixed with a scruple of the superacetate of lead. The accident was discovered in about half an hour, when an emetic was administered, and no serious consequences ensued.

## STATISTICS AND MISCELLANIES.

*Statistics of the lateral Operation of Lithotomy at Naples.* By M. S. DE RENZI. (*Il Filiatre Sebezio Giornale.* August 1840.)—From the year 1821 to 1828, inclusive, 596 cases of stone were operated on, 579 of whom were males, and only 17 females. Of this number 503 recovered, and 91 died; 306 of these cases occurred in persons under 15 years of age; 231 in adults; and 59 in aged individuals. As a means of comparing the mortality from this operation, the results of the operations of lithotomy for the year 1839 are given. During this year 47 were operated on, 46 of whom were men, and 1 woman. Of these 38 recovered, and 9 died. Of this number 15 were below 15 years of age; 31 were adults; and 1 was aged.

*Medical Reform from the Report of the Council of the North of England Medical Association, read at the Anniversary Meeting of that Society, held at Sunderland, April 7, 1841, and adopted unanimously.*—Since the last meeting of this Association,* the question of Medical Reform has made rapid progress. Shortly after it was held, the Medical Profession Bill of Mr Warburton, and the outlines of a Bill by Mr Hawes, were printed and published. These measures engaged the attention of your council, and having now been for several months before the profession, it is unnecessary, at this time, to enter into a discussion of their merits. Suffice it to observe, that in framing them, their authors seem to have been actuated by a conviction that the present Medical Institutions of the country are wholly inadequate to provide an efficient system of government for the regulation of the profession. Further evidences of the inefficiency of these bodies have not been wanting, and the Council hail it as a most favourable omen, that the subject of Medical Reform should, within the space of a few months, have occupied the serious attention of some of the most distinguished ornaments of the profession. The observations of Dr Kidd, Regius Professor of Medicine in the University of Oxford, Sir Benjamin Brodie, Mr Green, Sir Charles Bell, Mr Carmichael, Drs Macartney, Barlow, Forbes, Marshall Hall, &c. have tended greatly, not only to show the imperative necessity of *some* reform, but to indicate, more or less distinctly, the *principles* on which an amendment of our laws and institutions should be founded. In addition to the recorded opinions of these distinguished personages, the Council have to refer to the statements made public, not only by different Medical Associations, but by various incorporated bodies, in the shape of reports on the proposed plans of Mr Warburton and Mr Hawes, or on such alterations as have appeared to these several parties adapted to remedy the present anomalous condition of Medical Affairs in this country. The Colleges of Physicians of London and Edinburgh, the Medical Professors of Trinity College, Dublin, and of the University of Glasgow, the Colleges of Surgeons of Edinburgh and Dublin, the Apothecaries' Companies of London and Dublin; have published each its report, and although there is a considerable diversity in the modes which these different institutions would adopt in carrying out a reform of the profession, they all agree in admitting the necessity of extensive changes and amendments. That a difference of opinion should exist amongst them can hardly excite surprise, for they have ever been governed by different laws, have had separate interests, and in making their own regulations, have not in a small degree interfered with, and encroached upon each other. To produce a measure which would mutually satisfy these bodies would require an exercise of legislative skill which can hardly be looked for on behalf of a subject which has been so little understood, and the Council regret to add, so deplorably neglected by the ruling authorities of this empire. Some of the aforesaid documents are of a much more liberal and enlightened character than others, and the Council can not allow this opportunity to pass without expressing their high opinion of the report published in December 1840, by the College of Surgeons of Edinburgh. They are sorry that the example set by this corporation should not have been more closely imitated by others. The report of the College of Surgeons of Ireland is also deserving of honourable mention, and some parts of those promulgated by the Colleges of Physicians of London and Edinburgh contain just and liberal views. They are all deserving the serious consideration of the profession.

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* September 15, 1840.

At the anniversary meeting of the British Medical Association, held at Exeter Hall in October last, it was proposed that the different Medical Associations of the united kingdom should appoint delegates, to meet in London, with a view to deliberate upon the steps which should be taken to obtain from parliament a measure for the better government of the medical profession. To this appeal the associations were not slow in responding, and accordingly, in the month of February in this year, a conference commenced its sittings in London, consisting of representatives from the Provincial, the British, the Irish, the North of England, the East of Scotland, the Glasgow, the Gloucester, the South Devon, and the Cornwall Medical Associations. The discussions which took place at their several meetings were of an important and interesting character, and having settled some of the more prominent features of a plan, which, in their opinion, might form the basis of a legislative enactment, the delegates conferred with the Colleges of Physicians and Surgeons, and with the Master and Wardens of the Society of Apothecaries, London. These bodies stated that they had been for some time engaged in the consideration of changes, but upon the precise nature of these the delegates could obtain no very satisfactory information. They subsequently requested an interview with Mr Warburton, Mr Hawes, and Mr Wakley, for the purpose of explaining to those honourable gentlemen the opinions they had been led to form, and of requesting them to cooperate in bringing in to parliament a bill which should embody the principles contained in the published "opinions of the conference." Members of this Association are probably aware that in the early part of the present session of parliament Mr Hawes introduced a bill corresponding with the outlines already spoken of, but this, in consequence of certain informalities, was withdrawn. On the same evening on which the delegates conferred with the above named honourable members, Mr Hawes obtained leave to bring in an amended bill, The Medical Profession Bill, (No. 2.) The latter differed from the first bill in the omission from it of all clauses relating to chemists and druggists, and to the infliction of penalties on unlicensed medical practitioners. In the former of these alterations the delegates entirely acquiesced, they having previously declared an opinion, that although the trade of chemists and druggists required the intervention of parliament, it would nevertheless be inexpedient to introduce clauses relating to it into a bill for regulating the medical profession. To the second omission, they did not so willingly assent, having stated that in their opinion, no unlicensed person should be permitted to practise medicine for remuneration or pecuniary gain, in any part of the united kingdom. Mr Hawes, in reply, said that he had been induced to make the change from the difficulty, if not impossibility, of effecting an immediate suppression of illegal practice, and from a belief that to make the attempt a feature of his bill would be to risk other parts of it. He should not object, however, to have the sense of the House of Commons taken upon the point, if, in the event of the bill being read a second time, any member would move the insertion of penal clauses in a committee of the House. Upon these grounds, Mr Warburton, with a disinterestedness highly honourable to him, said, that he was willing to support the bill of Mr Hawes instead of bringing forward his own, and Mr Wakley, upon the condition stated above, declared that he should likewise support the principles of the bill and vote for its second reading. The delegates, convinced of the importance of bringing the question of medical reform under the notice of the legislature during the present session of parliament, determined to petition in favour of the principles of Mr Hawes's bill. These may be briefly stated to consist in, 1. The formation of a Medical Council in each division of the United Kingdom. 2. The appointment of a Board or Senate to which shall be intrusted the framing of bye-laws for regulating the education and examination of all persons who shall hereafter receive a license to practise medicine in Great Britain and Ireland. 3. The registration of legally qualified medical practitioners.

With respect to the first of these principles, it seems to be allowed on all hands, that the profession requires for its governance a responsible head or board of control.* On the nature and construction of this board, opinions are various. Sir Benjamin Brodie would make it a "Board of Visitors," appointed by Her Majesty's Privy Council; Mr Green advocates a "State Council for Medical Affairs," composed, in part, of laymen, appointed by the Crown, and partly of medical persons, also appointed by the Crown, but on the recommendation of the medical corporations, a certain proportion being nominated by each. A similar plan has been sanctioned by the Royal College of Physicians of Edinburgh. Some there are, who would form a governing body of a given number of persons delegated by the Councils of the Colleges of Physicians and Surgeons of the three countries, the said Councils having previously been elected by their respective commonalities, the latter having in this way an indirect appointment of the superior board. A fourth party would incorporate into a faculty all medical practitioners possessing certain qualifications, with power to elect (under certain limitations) a council for each division of the united kingdom. It has been objected to the latter method, 1. That it would introduce agitation into the profession. 2. That it would cause "jealousies, altercations, and dissensions." 3. That it would subvert the different orders of the profession. 4. That a Representative Council would not have the confidence of the profession, or promote its "harmony and public utility." 5. That the "necessary canvass" and occupation of time would prevent men of eminence from filling the offices of the proposed body. The Council, without wishing on this occasion to enter into an examination of the several modes whereby a superintending or controlling body might be formed which should be alike responsible to the crown, the legislature, and the profession, are nevertheless compelled to state that in their opinion, some of the fears embodied in the foregoing objections are greatly exaggerated, whilst others are wholly gratuitous and unfounded. To the first of them the Council would reply that a greater agitation could scarcely be occasioned by the elective franchise being given to members of the profession, than exists at present, from its being withheld from them, and that the means which have been suggested for conducting the voting for members of a general Council would place it in the power of each elector to record his votes without leaving his own dwelling. To the second, that fewer jealousies, altercations, and dissensions would perhaps ensue from the proposed change than are caused at the present moment by the exclusion of the bulk of practitioners from all control over the medical institutions of the country, the absence of any protecting influence on the part of those bodies, and the total want of similarity in the qualifications and privileges of candidates for practice; to say nothing of the heart-burnings occasioned by the unwarrantable distinctions existing in some instances (as in the London College of Physicians) between members of the same corporation. That a Representative Council would be the means of subverting the different orders of the profession is a fear which appears to your Council to be altogether imaginary, the abrogation of the classes or grades into which the profession is at present divided, forming no essential principal of Medical Reform.

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* "To some board of reference—some head, of which the existing branches of the profession should serve as members of a common body, we should not object."—London Medical Gazette, Vol. xxvii. page 523.

Some of the objections which, under this head, have been raised against a general incorporation of the profession, are not only absurd, but inconsistent likewise. Thus the College of Physicians of London stated in a petition presented to the House of Commons on February 19th, "That the division of the medical profession into the several departments of the physician, the surgeon, and the apothecary, has been created by the public itself, and will continue to exist, notwithstanding any attempt which may be made to unite the functions of the three in one;" but in his reply to the Medical Delegates, dated March 9th, Sir Henry Halford states that the College cannot sanction the amalgamation of the existing orders of the profession into one faculty, and the consequent extinction of that salutary division into Physicians, Surgeons, and Apothecaries, which a few days previously, the College had declared would continue to exist notwithstanding "any attempt" which may be made to unite the functions of the three in one. That a Council chosen by the profession should not have the confidence of that profession is scarcely to be accounted for, nor is it quite apparent why the heads of the Corporations should deem those members whom they have admitted on proof, not only of professional, but also of moral qualification, unfit to be trusted with the elective franchise, or incapable of forming a correct judgment respecting the individuals who might with advantage be chosen members of an executive medical council.

Instead of proving injurious to the public utility of the profession, it might be not unfairly surmised that a general medical council would have an opposite tendency, for it can hardly be doubted that the profession contains within itself a degree of knowledge and experience which, if properly evolved, might be rendered eminently conducive to the public welfare.* The necessity of a canvass needs no comment: it would be impracticable. What man could undertake to canvass a constituency spread over every county of England, or of Scotland, or of Ireland? And as to the impossibility of men of eminence finding time to perform the duties of councillors, it has happened, hitherto, that such persons have not only been able to discharge similar functions, but, in addition, to occupy many hours weekly in fulfilling the office of examiners. The Council, before quitting this subject, take leave to quote a passage from a letter of Mr Key, Senior Surgeon of Guy's Hospital, relating to the London College of Surgeons, and contained in the London Medical Gazette of Dec. 6th, 1839. "An election of members of council by a learned body cannot be termed popular in the objectionable sense of the term. A popular election is defective from the passions or interests of the electors giving them an improper bias, or from ignorance of the qualifications necessary for a member of the council. The interests and feelings of the members would be identified with the college, and no improper motive would be likely to interfere with a sound exercise of their privilege."

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* "It is an evil that there is no incorporated body which can be said to represent the collective wisdom and experience of the whole profession, so as to render them available to the state, in the manifold instances in which their guidance is required. Enactments are constantly passing the legislature, which involve considerations connected with medical science, such as sound medical judgment alone can decide. National hygiene, medical jurisprudence, medical police, the investigating of epidemic and endemic diseases, the healthfulness of particular manufactures, with many others, may be cited as instances. For the full consideration of all such matters, a well organized profession should, in its governing body, which, if elected by the profession itself, would be sure to contain the highest capabilities and attainments existing in the profession, supply a Medical Council on which the state might confidently rely for information and guidance whenever the ascertainment of medical truth became essential for establishing the fitness or efficiency of legal statutes."—Provincial Medical and Surgical Journal, Vol. i. p. 65.

"Had there existed in this country a Board of Health, properly constituted and elected from the general profession, is it likely that so important a matter would have been entrusted to so inefficient a set of men as Boards of Guardians must be in their knowledge of the best means to be adopted for the extension of vaccination, and the improvements of its practice?"—Dr Hastings.—Provincial Medical and Surgical Journal, Vol. i. p. 90.

The second principle of Mr Hawes's bill relates to the qualification of future candidates for a license to practice medicine. This he proposes to render uniform in the three kingdoms, through the medium of a General Medical Senate.

There can be no question, that one of the greatest evils which beset the profession, consists in the disparity in the education and examinations enjoined by the different Universities, Colleges, and Halls, which at the present time have power to confer degrees, diplomas, and licenses. The Council are strongly of opinion that such inequality is most injurious to the public as well as to the medical practitioner, and that measures should be taken for enforcing uniformity in these important particulars throughout each division of the united kingdom. They are furthermore persuaded, that a definite qualification should be established, without which no person should receive a legal recognition to practice medicine within these realms. But this desirable object cannot be accomplished so long as the regulation of education and examination is confided to eighteen distinct and separate institutions, each endowed with the capability of legislating apart from the rest.* Each also having a direct pecuniary interest in the number of candidates qualified. "It is notorious," says Mr Green,† "that the qualifications which these institutions require are almost as various as the institutions themselves, and differ where it would be difficult to assign any plausible reason for the difference, that their powers are diverse, and, in many instances, conflicting; and it will be admitted, as indeed it has been loudly complained of by the profession, that they very imperfectly, if at all, answer the purposes for which we must presume, they were designed." So long ago as in the year 1818, upon a bill being introduced into the House of Commons for regulating the practice of surgery, the following apposite remarks were made by Sir Robert Peel:

"If it were sufficient for a party merely to appear before a certain Board, in order to procure a license or diploma, on payment of a sum of money, it was to be feared that the practice would ultimately degenerate into one of considerable abuse. It was natural to suppose that a competition would soon be entered into between the several bodies who had a power to grant licenses, for the purpose of procuring the greatest quantity of fees. The more testimonials they granted, the greater would be their profit. It would evidently be to their advantage to grant as many as possible; and therefore it appeared to him, that unless they had some other test of ability beyond a mere diploma, a great abuse would be generated. He very much feared that the fees required for the diploma would alone be looked to, and that the examination would become a mere formality."

To rectify a state of things prejudicial in the extreme to the "public utility" of the profession, and productive of a most unfair competition amongst its members, some controlling or superintending body, which shall exert a common influence over the three divisions of the united kingdom, is absolutely requisite. Under the authority of such a Board, an adequate and uniform system of education might be expected to prevail, and the examinations of parties desirous to obtain a license to practice would certify the proficiency of the candidate in all departments of the healing art. "All entering the profession through the same course of instruction and examination; all would have their general competency adequately proved;"[*]—but such an arrangement would not prevent the licentiate from attaching himself more particularly to one or other department of practice, neither would it preclude the attainment of degrees or honorary titles in medicine or in surgery, nor the possession by persons holding them of such privileges as physicians and surgeons at present enjoy. Dr Marshall Hall, in a letter to Sir Robert Peel,[†] whilst suggesting that licenses to practice should emanate from a National Faculty of Medicine, observes, "the diploma of the Faculty will convey the license to practice, with equal rights, &c., but it will not convey any honour beyond that of being enrolled amongst the members of a highly respectable profession, made still more respectable by higher qualifications. Honour must be sought from the other existing, but reformed institutions, which will indeed come to be regarded as the special institutions of honour in our profession." And in the published opinions of the conference lately held in London, the delegates have stated that they wish not "to interfere with the power of any University or College to grant degrees, diplomas, or titles in medicine or surgery," hinting at the same time, that in justice to the public and to the medical practitioner, "such distinctions should be based on clearly defined and uniform principles." Under no circumstances would there be a deficiency of candidates for such honorary distinctions as our universities and other public bodies are accustomed to bestow. The Colleges of Physicians and Surgeons would still be resorted to (as they now are) by persons desirous to enrol themselves as members thereof, and if a liberal policy were pursued by these establishments, they would undoubtedly become institutions of honour, revered by the profession, and useful to society.

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* "The corporations are all independent of each other. There is no bond of union between them. They have to legislate for a profession, the different branches of which are necessarily much connected with each other, but they all act separately. They are responsible only to themselves and to the slow operation of public opinion."—Quarterly Review, Dec. 1840.

† Touchstone of Medical Reform.

It is scarcely necessary to observe, that uniformity in the qualification of practitioners in each of the three kingdoms should be attended with a corresponding equalization of privileges, and the abolition of those exclusive rights of some of the corporations which disqualify all but their own members from practising within certain limits.[‡]

For conducting the examinations of candidates for a license to practice, it was stated to be the opinion of the medical delegates that one examining board should be established in the capital of each country. Such a proposition has been sanctioned by high authorities, as by Sir Benjamin Brodie,[§] Professor Kidd, Drs Barlow, Arnott, Forbes, &c. The formation of three boards was sought in a petition which was presented to both Houses of Parliament in the year 1839 by the Provincial Medical and Surgical Association, and has been supported by other associated bodies. Various opinions have been expressed upon the most eligible method of constructing these boards, into a consideration of which it would be unprofitable to enter in this report. Certain parties have maintained that under the superintendence of a senate or board of control, the several corporate bodies which are now separately concerned in examining might still be allowed to exercise that office as heretofore. That the duty would be more efficiently performed by one board in each country, than by several, scarcely admits of doubt, but at the same time it is only due to those who hold an opposite opinion, that the latter should be carefully and dispassionately considered.

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[*] British and Foreign Medical Review, Vol. ix. p. 285.

[†] Lancet, March 20th 1841.

[‡] "As we think it expedient that the licensing bodies should be limited to the capitals, so it further appears to us no more than reasonable to require that there should be such an amalgamation of views and arrangements in regard to preliminary education, and the standard of knowledge required, as to enable the possessor of a diploma in any of the establishments to procure his recognition as a licensed practitioner in any part of the empire."—London Medical Gazette, Vol. xxvii., page 520.

[§] Medical Evidence, 5676.

The registration of all qualified medical practitioners forms a prominent feature of the bill of Mr Hawes, and it is undoubtedly of the utmost importance that the public should have access to a faithful record of the names of persons who may hereafter receive licences to undertake the responsibilities of the healing art, as well as of the nature of the qualifications of those who are already engaged in practice. The council would take the liberty of suggesting, that the plan of registration proposed by Mr Hawes might perhaps be simplified, and that it should not be the means of entailing an annual payment on the medical practitioner.

Impressed with the desirableness of confiding the direction of medical affairs to a responsible system of government, not less than with the justice and expediency of establishing uniformity in the qualifications and privileges of future candidates for medical practice throughout each division of the united kingdom, and believing that it would tend to the advantage of the public, that all such persons should be duly registered, (lists of names being published periodically,) the council have considered themselves justified in recommending the association to petition the House of Commons to sanction the principles of the Medical Profession Bill now before Parliament, although they must not be thereby understood as giving their assent to the details of that measure, or to the precise mode in which Mr Hawes has endeavoured to give effect to the principles on which his scheme of reform has been founded. This is indeed by no means necessary, for the several clauses of the bill would probably undergo material alterations during its progress through a Committee of the House of Commons, and it is not to be supposed, that, on a subject of so much difficulty, it would be possible for any individual, especially for one unconnected with the profession, to frame a measure which would not require considerable amendment. It is, however, most desirable that the bill should be read a second time, as the question of Medical Reform would thus come under the immediate notice of the Legislature, and as a motion will be made to this effect a short time hence, the council hope that the subject, when again introduced, will receive from the Legislature a degree of attention commensurate with its important bearing upon the public safety and welfare.

For some months past, it has been understood that the Colleges of Physicians and Surgeons, and the Society of Apothecaries of London, have been jointly occupied in considering the propriety of certain changes in their respective constitutions, whereby to remedy the many defects at present complained of in the medical profession. Such a movement must be regarded as an unanswerable proof that fundamental alterations are required. Medical practitioners throughout the country will rejoice to see the corporate bodies engaged in the work of reformation, and will be prepared to receive with respect, any measure which may emanate from them, containing, as they do, some of the most enlightened members of the profession. The council are not, however, disposed to rely so far on the intentions of these bodies, as to recommend this association, in awaiting the appearance of their plans, to discontinue, or even to relax, their own efforts in the cause of Medical Reform. The corporations have long been aware of the dissatisfaction existing in the profession. They have, nevertheless, allowed themselves to be anticipated in legislative proceedings by two members of Parliament, wholly unconnected therewith ; and they have not roused themselves until the profession has been thrown into agitation throughout the length and breadth of the land. Their present exertions cannot, therefore, be regarded as entirely of a spontaneous character, but rather as the consequences of an irresistible " pressure from without."

The jurisdiction of the College of Physicians, at the present moment, comprehends the examining and licensing of persons who are desirous to practise as physicians in London, or within seven miles of that metropolis. Some time ago, the College assumed the right of examining for its license persons who had not previously graduated in a British University, but its power to confer degrees has been disputed, this function having been regarded as the exclusive prerogative of the universities. It is now desirous, upon certain conditions, to forego the examination of graduates, but as an equivalent, seems wishful that all physicians who have reached the age of twenty-six years, practising or hereafter intending to practise in England, should be enrolled in its " order of licentiates." The College thinks it desirable, " that uniform medical qualifications should be demanded of all candidates for the degree of M. D. in England, Ireland, and Scotland, and that the degree of M. D. so obtained in either country should henceforth confer a right to practice in all, provided the graduate shall have enrolled himself in the College of Physicians of the country where he resides," and for carrying into effect these propositions, suggests, that a Board of Visitors, or some other controlling body, should be appointed, to which the bye-laws of the Colleges of Physicians should be submitted for approbation. Now, if under the superintendence of such a board, the regulations for the granting of degrees could be assimilated throughout the united kingdom, it might be a question whether the graduate of an university should be expected to take the license of any College of Physicians, or whether, under the arrangement in question, the " order of licentiates" might not be entirely abolished, and an end thus put to a division amongst the members of the London College, which has, during a long series of years, been the cause of continual strife and litigation, and of the intention of which, according to Dr Kidd, (a fellow of the College,) " there is no indication in the original statute of foundation, or in the subsequent confirmations of that statute." " Equalization of qualification," says Dr Barlow,* " being ensured, all pretext would be removed for making distinctions among physicians, by gradations of collegiate rank, which only minister to unseemly pride, and confer no public benefit whatsoever."

The College is anxious to protect the interests of its own branch of the profession in the three kingdoms, or, in other words, " to claim from the legislature a confirmation and extension of its jurisdiction"—a jurisdiction which, it would appear, is not to be limited to physicians, but is to be diffused over other departments likewise. Thus, the College proposes that two of its fellows shall assist in conducting the examination at Apothecaries' Hall. It is willing also to aid in the construction of a midwifery board, and has so far overcome its repugnance to pharmacy, as to undertake, with the assistance of the Apothecaries' Company, to examine and license the chemists and druggists of England within the College walls ?

In any attempt to re-organize the profession, the consideration which the legislature may feel disposed to exhibit towards the present corporations will depend not wholly upon their promised improvements, but in a great measure, perhaps, upon a review of their past history. Before granting to one or other of them an extension of authority, proper inquiry will, in all likelihood, be made respecting the manner in which the powers already intrusted to it have been discharged, and it will then be for Parliament to decide how far it shall be allowed either to participate in, or to obstruct the establishment of an amended scheme of medical government.

The power given by its several charters to the College of Physicians of London has been considerable. It was instituted " for the advancement of medical science, and for the protection of the public against the temerity of wicked men, and the practice of the ignorant." It may then not unfairly be demanded, has the College fulfilled the terms of its charters ? Has it promoted the public welfare—fostered merit—encouraged science—protected the profession ? To none of these queries can a satisfactory answer be given. In no civilized country have the interests of the public in connection with medicine been more grossly neglected than in this, and in none perhaps has the reward of distinguished merit been less dependent on corporate patronage. Instead of encouraging, it is notorious that in some remarkable instances, the College has opposed the advancement of science, and the improvement of medical education. It opposed the formation of the Royal Medico-Chirurgical Society, one of the most flourishing scientific bodies in the kingdom, the transactions of which have been pronounced by Dr Copland to be " the most valuable perhaps of any collection of papers that have been published since the commencement of this century." Unable of itself to counteract the manifold evils arising from the " practice of the ignorant," evils attributable in a great degree to its own supineness and neglect, the College also opposed the passing of the Apothecaries' Act. Respecting the protection of medical practitioners by the College, it has been remarked, that " instead of combining and consolidating even that branch of the profession which it was specially appointed to superintend, it limited the powers and privileges of the corporation to a few, placing the great mass of physicians who consented to acknowledge its authority, in the subordinate and degraded class of licentiates, endowed with no corporate rights, and deriving from their connection with the College only leave to practice their art, which the license of the College graciously permitted them to do, " saltem in nonnullis curationibus."* The College was originally chartered to superintend both surgery and pharmacy, as well as medicine, but how far its duty in regard to the two first of these departments has been fulfilled, may be learnt from the transactions connected with the passing of the Apothecaries' Act in 1815,† when the mass of English medical practitioners were consigned to the superintendence of a " City guild and trading Company of Apothecaries,"‡ a superintendence which, according to their own confession, came upon the company by surprise, and for which they were wholly unprepared. The most ardent supporters of the College of Physicians cannot affirm that its policy in times past has been such as to entitle it to the confidence and respect of the legislature, the public, or the profession. The foregoing remarks are made from no vindictive or malevolent feeling, but from a sense of duty. The Council are by no means wishful to deprive the College of every consideration to which it is entitled; on the contrary, they are desirous to see it remodelled and improved, believing that a reformed College might constitute a most useful and honourable branch of a reconstructed profession. Let this corporation be as it name applies, a College of Physicians. Let it attend to its own peculiar department, nor interfere with apothecaries or druggists, after having for a long period of years disdainfully repudiated all connection therewith. The College may perhaps be solicitous to atone for past errors, and to retrieve its lost ground, but having of its own accord relinquished the general superintendence of the profession, it surely cannot now lay claim to divert the attention of Parliament from the consideration of other projects which may be directed to that end.

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* London Medical Gazette, Vol. xiii. p. 941.

The College of Surgeons of London has yet made no public declaration of its proposed amendments. The defective constitution of the Council of this body has been ably commented upon in the London Medical Gazette of December 25th, 1840,§ and in Mr Aston Key's admirable letter, published in the same Journal of December 6th 1839.* The objectionable manner in which its Court of Examiners is chosen has been shown in the well-known article on Medical Reform published in the Quarterly Review for December 1840. The College has no legal authority over persons practising surgery; its diploma is honorary,† and although it is is eagerly sought after by the student, a very large number of persons practice the surgical branch of the profession in this country, some with an apothecary's licence only, others without any qualification whatsoever. Of the laxity with which it diploma is granted, Sir Charles Bell (formerly a member of the Council) states as the result of thirty years experience of teaching in London, that "the College of Surgeons has known that the young men presenting themselves as candidates for diplomas have been both imperfectly and improperly educated. They have known that their teachers were not surgeons, and as anatomists, knew not its application to surgery; that the young men were crammed with words, and were not taught by such prelections as are necessary to improve the mind, and form the medical character."‡ This college is equally implicated with the College of Physicians in the abandonment of the general practitioner in the year 1815, thereby incapacitating its members from compounding their own prescriptions without an infringement of the law.

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* British and Foreign Medical Review, Vol. ix. p. 281.

† " The College of Physicians, first in nominal rank, and last in professional influence of all the medical corporations, owes its present unpopularity and comparative insignificance, partly to the exclusive and invidious nature of its bye-laws, and partly to having neglected, nay positively declined to exercise that jurisdiction to which it was entitled by its charter, and of which a specific offer was made by the Government in 1815, before their present great and extensive powers were conferred on the Society of Apothecaries."—London Medical Gazette, Vol. xv. p. 664.

‡ Green, Touchstone of Medical Reform.

§ " A governing body, self-elected and irresponsible, is repugnant to the spirit of

The Society of Apothecaries have published a manifesto. They desire to give up searching the shops of apothecaries, an occupation which has never cost them much trouble or inconvenience; they are also willing, in consideration of the great expence with which it is attended, to discontinue the prosecution of unlicenced practitioners, suggesting in its stead a summary conviction. They would allow a part of their Court of Examiners § to be composed of licentiates who are not members of the society, the election still, however, remaining with the society. They propose to shorten the term of apprenticeship to an apothecary, or to receive as an equivalent a certain period of instruction in practical pharmacy. They would coalesce with the College of Physicians in examining chemists and druggists, and would form conjointly with it or the College of Surgeons a midwifery board. They think that the College of Surgeons and the hall should cordially unite in forming a curriculum of study that would apply equally to the surgical and medical student (to which proposal the former body has not yet returned an answer.) The society make two important admissions. 1. That the members of the medical corporations should have some share in the management of those bodies. 2. That uniformity of education and of privilege should subsist throughout the three kingdoms.

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the times." * * * "So long as their members are brought together by no exercise of any general privilege, and so long as their proceedings are veiled from the public eye, so long will the Council of the College of Surgeons fail to acquire popularity, however irreproachable their conduct may be."—Med. Gazette, Vol. xxvii. p. 251.

* "The members have no community of feeling with the College."—Key.

† "The College have a direct interest in having as many applicants for their diplomas as possible. This is not what the public want."—Quarterly Review, December 1840.

‡ "Few would even be bold enough to say that the diploma of the college is a reliable voucher of the skill and knowledge required in the ordinary emergencies of the profession. But it is quite plain that the education now required as the preparation for the examination at the College, includes no provision for preliminary education, for early discipline, for the training of gentlemen; no provision, in short, for a comprehensive professional education."—Touchstone of Medical Reform, page 63.

§ "It is most likely, as indeed is the fact, that in the class of general practitioners, those most eminent in practice, and the most sedulous cultivators of their profession as a science, will be found elsewhere than in the metropolis."—J. H. Green, Touchstone, &c. p. 69.

The Society of Apothecaries have failed to protect the public and their own members from irregular and illegal medical practice. They have, it is true, from time to time, altered and extended their regulations with respect to education, not unfrequently to the great annoyance of the teacher as well as the pupil. Their curriculum has been increased, until, as Sir Benj. Brodie informs us, the medical student is expected to attend not fewer than 1500 lectures, but it cannot be affirmed that the society have taken the proper course for augmenting, in a corresponding ratio, the practical knowledge of candidates for their license. It too commonly happens that in preparing for his examination, the student is merely "crammed with words,'* and that the licentiate begins the actual duties of his profession with a very inadequate qualification for their efficient and successful performance. During the early part of the present Session of Parliament, a petition was presented to the House of Commons, from the Society of Apothecaries, in which it was stated, in the same words as in one presented also from the College of Physicians, "That a course of study and a test of competency, adapted to each particular branch of the profession, affords a much surer guarantee for a high standard of qualification in each branch than could be obtained by a course of study and examination common to all." There might be some validity in this argument, if the precise limits of medicine and surgery, could be accurately marked out, or if the practitioner of one or other branch could confine himself strictly to his own department; but such is not the case. Dr Kidd has well exposed the fallacy of such reasoning. "Every physician," says that learned professor, "ought to be acquainted with the principles of surgical practice, and even in London all surgeons must necessarily act as physicians in very many of the cases of their specific practice; while out of London, except in the very largest provincial towns, no surgeon could gain a competence were he to confine himself to a practice purely surgical." The College of Physicians and the Apothecaries' Company know, or ought to be aware, that although a few examples of the pure apothecary are still extant in the metropolis, throughout the kingdom generally, the duties of that functionary and of the surgeon are almost invariably combined in one and the same individual. Hence, to borrow again the language of the Oxford Professor, it follows, "that every candidate should be qualified for all the three branches of medical practice, since this being granted in the case of the physician and surgeon, it must necessarily be granted in the case of the 'general practitioner,' inasmuch as he combines in his own practice, the practice of the other two." In the opinion of the council a separate preparation and course of study for the different orders of the profession is reprehensible in every point of view. It must always be for the advantage of a science so extended as that of medicine, that there should be divisions of labour amongst its cultivators; but up to a certain point there can be no question that all practitioners should pursue the same studies, regardless of any subsequent partiality which they may exhibit toward one or other department, or of any degree or title in that department to which they may aspire.† The College of Surgeons of Edinburgh has justly remarked that

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* "It is notorious that the majority of those who mean to offer themselves for examination at the College of Surgeons, or at Apothecaries' Hall, are for two or three preceding months, regularly and daily drilled for the occasion. That there are individuals in London who make considerable incomes by dispensing this spurious species of instruction, and that it is no small proportion of the medical students, who having neglected all the early part of their education, are at last qualified in no better way than this, for the examination which is to crown their labours."—Quarterly Review, December 1840.

† "There can be no good physician who does not understand the practice of surgery." * * * "No man is fit to practise surgery who is not a good physician." * * * "It is a folly to say that any man is a pure surgeon, for as to practising surgery without physic, it is absolutely impossible."—Sir Astley Cooper, Med.

"The great object of the public is to have the general practitioner thoroughly instructed in all departments of the profession. It is on the scientific discrimination and treatment of diseases in that early stage when he alone is consulted, that the preservation or loss of health generally depends." But the "General Practitioner" is not so much as recognized by the London Corporations, and, perhaps, not without reason, for it is somewhat remarkable, that until the establishment of the University of London, there was not in England any board which was competent to conduct the examination of the "General Practitioner." This is an order of comparatively recent date, and for whose superintendance no provision has been made by the London Colleges and Hall, but which has, nevertheless, obtained, and is daily obtaining still more, the public confidence and esteem. The College of Surgeons examines in anatomy, physiology, and surgery; the Apothecaries' Court of Examiners do not interfere with surgery; neither of them is authorized to examine in midwifery. Nevertheless, the members of the former body, owing to a defective law, act as general medical practitioners, whilst those of the latter are permitted to assume the name and to enjoy the privileges of surgeons; any individual, either lay or medical, being at liberty, in this country, to practice midwifery. Such is the practical working of "a course of study, and a test of competency adapted to each particular branch of the profession," such the grounds upon which the College of Physicians and Society of Apothecaries think themselves authorized to represent to the legislature "that the existing medical institutions of this country are fully adequate to the performance of the duty of superintending the education of candidates for the practice of the medical profession." (If this be the case why should there be examinations before army and navy medical boards?) The corporations will scarcely be borne out in this assertion by their own members, since nearly the whole of the numerous petitions presented during the last and present session of Parliament, complain of the inadequacy of these bodies to regulate medical education, &c. The Council are not aware that any petitions favourable to their administration of affairs have been presented, with the exception of one from the President and Fellows of the College of Physicians, a second from the Council of the College of Surgeons, and a third from the Master, Wardens, &c. of the Society of Apothecaries. It is undeniable that these bodies do not, at the present time, possess the confidence of the profession, and every candid enquirer must admit with Sir Benjamin Brodie, that their interests "are not always identical with those of the public;" with Sir Charles Bell, "that, in their corporate capacities, they have been indifferent to the moral influence of the profession;" with Dr Hastings, that "they feel little or no interest in the prosperity of the ge-

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Evid. 5,443, 5,588, 5,628. "All the different branches of practice are so connected with each other, that a physician and a surgeon ought to have the same studies in the first instance."—Sir B. C. Brodie, Med. Evid. 5,757. "With the exception of whatever bears upon the manual skill of the surgeon, all the principles of the various branches of medical science ought to be known in common by both the physician and the surgeon."—Dr Seymour, 1,000. "The surgeon ought to be a physician, and the physician a surgeon."—Dr Farre, 3,430. "I would make no distinction between the education of a physician and a surgeon."—Dr Arnott, 2,443. "The triple separation of the profession is injurious in this respect, that the surgeons are not required to furnish any proof of medical knowledge, and far less of any preliminary education, their examination is strictly surgical, while, at the same time, nine-tenths of their practice is purely medical. The physician and surgeon should both be educated alike, as on the continent, and then let any one take up the branch of surgery, or the branch of purely medical practice, according as it may suit either his studies, or his peculiar ideas or wishes."—Dr Copland, 3,282.

* "It is not so much practitioners of these descriptions (physicians and surgeons) as it is those who belong to the class of general practitioners, that require the attention and protection of the legislature."—Quarterly Review, December 1840.

neral members of the profession;" and with Mr Green, that "they very imperfectly, if at all, answer the purposes for which we must presume they were designed." With every wish, therefore, to give to their plans of self-reform, whensoever they shall appear, the most careful and unprejudiced consideration, and with the most profound respect for many of the eminent personages who now hold office therein, and who, like the distinguished individuals just named, would shed a lustre over any institution with which they might happen to be connected, the Council have to repeat their recommendation to the members of this association not to abate their efforts, but to exert every influence they possess in procuring from the legislature an enlightened and comprehensive measure of reform. The designs of the London corporations are as yet but imperfectly developed, and it remains to be seen whether, when matured, they will be acceptable not to their own members only, but to the other fifteen chartered medical bodies of the empire. It is therefore most desirable, as a medical bill is at this time before Parliament, that the momentous subject to which it relates should not be postponed, since an opportunity would be afforded the corporations, during its discussion, to state their opinions and the probable nature of their contemplated amendments. The Council have no wish to see the medical institutions of the country impaired, much less destroyed. They think that, with certain modifications, these bodies might be advantageously rendered component parts of a general or national system of medical polity, wherein "each vying with another in a spirit of liberal emulation, they might continue to benefit both individuals and the public quite as effectually as under the present system."*

*Military Surgery Class and its importance.*—The following communication, which was transmitted to the Professor of Military Surgery in this University at the close of last session, appears in the *Naval and Military Gazette* (7th August 1841), with some very appropriate remarks by the editor. We have been favoured with a copy of the Professor's reply, which we have the pleasure to subjoin.

"We the undersigned Medical Officers of Her Majesty's, and the Honourable East India Company's Service; who attended Sir George Ballingall's Class of Military Surgery, during the Session 1840–41, while recording our sense of the value of the course, express our regret, that at the period we received our professional education, no such source of instruction was open to us.

"We feel assured that all who have been called upon in the early part of their military career, to give opinions on subjects, and to act under circumstances which they were unprepared to meet, will concur with us in advocating the necessity of instituting a class of military medicine and surgery in each of our great medical schools; so that young medical officers, when ordered to examine recruits, to sit as members of invaliding committees, to make arrangements for the conveyance and comfort of the sick and wounded, under every possible contingency, to discriminate fictitious or feigned from actual diseases (questions they may be called on to decide before Courts-Martial); when consulted on the eligibility of sites for camps, cantonments, barracks, hospitals, &c., may be well informed as to the general views entertained on these subjects, instead of being left to act on their own solitary and unaided judgment.

"As so large a proportion of our army and navy is constantly employed in warm climates, how indispensable must the knowledge of tropical diseases be! yet how imperfectly is this essential branch of practice taught in the usual routine of medical education! in fact, with scarcely an exception, there is not a professor or lecturer on medicine, qualified by residence or service in those countries, to communicate it.

"We rejoice to observe in a recent number of the *Naval and Military Ga-*

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* Professor Kidd.

*zette*, (January 30th 1841,) that this subject is taken up in connection with the valuable statistical inquiries which have lately been made into the sickness and mortality of the army and navy, and we are confident that nothing could be more conducive to the public interest than the appointment suggested by the writer, of professors of military surgery in London and Dublin, to whose province it would fall to keep the results of these statistical inquiries constantly before the rising generation of army and navy surgeons.

"This expression of our sentiments has necessarily been delayed, till the completion of the course enabled us to judge fully of its importance, and this circumstance, we regret to think, deprives us of the co-operation of several of our brother officers who were present during the earlier part of the session, and who, knowing as we do the discouraging circumstances under which Sir George Ballingall undertook the duties of the chair of military surgery, would have participated with us in expressing the satisfaction they felt at the successful result of his labours, now extending to a period little short of twenty years.

(Signed) D. C. Bell, Superintending-Surgeon, Bombay Estab.
W. Hacket, M. D., Surgeon to the Forces, P. M. O. N. B.
J. W. Watson, M. D., Surgeon, 63d Regiment.
J. Dempster, Surgeon, 17th Lancers.
J. M'Cosh, M. D., Bengal Army.
John Ferrier, Surgeon, R. N.
F. Sievewright, Surgeon, 9th Regiment.
Arthur Wood, M. D., Surgeon, 29th Regiment."

*Edinburgh, 20th June* 1841.

My Dear Sir,—I have been favoured with your note of this date, inclosing a statement of the opinion of several medical officers who attended my class last winter, as to the importance of lectures on military medicine and surgery.

You will readily believe that I receive, with no common satisfaction, the expression of these sentiments from gentlemen of your standing in the service,—sentiments which I have reason to believe are in perfect unison with those of the many intelligent and experienced medical officers who have done me the honour of attending my lectures, amounting now to nearly 250 in number;—sentiments which will, I trust, have their due weight in leading the authorities to consider of the propriety of establishing similar lectureships in the other metropolitan schools of medicine.

In addition to the advantages which you enumerate as likely to accrue from such institutions, there is one, upon which a feeling of delicacy would naturally forbid you to dwell, but which has ever been one of the foremost in my estimation; I allude to the preservation for the students of military surgery, and consequently for the public, of many valuable cases and communications which are elicited from day to day by the successive discussion of the several topics embraced in the course.

These communications, coming from gentlemen of observation and experience in the public service, it has always been a most agreeable part of my duty to record,—to analyse,—and to bring forward from year to year for the information of each successive class of students. Of such communications (as I took occasion to observe in my concluding lecture), I have never received more, either in number or in value, than during the bygone session. And with the renewed assurance of my gratitude for them, and with my best wishes for the personal happiness and professional success of the medical officers of Her Majesty's and the Honourable East India Company's Service,—Believe me, My Dear Sir, yours very faithfully

D. C. Bell, Esq. Geo. Ballingall.
Superintending Surgeon, Bombay Establishment.

## GRADUATIONS AND SURGICAL EXAMINATIONS.

*Medical Graduations at Edinburgh.*—On the 2d of August 1841, the Senatus Academicus of the University of Edinburgh conferred the Degree of Doctor of Medicine on the following gentlemen, in number one hundred and three, after having gone through the appointed examinations, and defended publicly their Inaugural Dissertations.

### OF SCOTLAND.

Kenneth Mackenzie Adams, on Retention of the Placenta.

Thomas Anderson, on the Nature of the Chemical Changes which take place in Secretion, Nutrition, and the other Functions of Living Beings.

Hugh Tod Spalding Beveridge, on the Diseases of Prisons.

William Johnstone Carlyle, on Aneurism.

Robert Cassels, on Tubercular Phthisis.

Hugh Francis Clarke Cleghorn, on the Reparation of Wounds and Regeneration of lost Parts.

Thomas Cossar, on Diabetes Mellitus.

Alexander Cuming, on the Symptoms and Treatment of Hepatitis.

James Dewar, on Surgical and Medical Cases.

Walter Dickson, on the Pathology of Dropsy.

Robert Ellis Dudgeon, Practical Observations on the Cure of Cataract.

George Duff, on the Phenomena and Causes of Animal Heat.

Henry Dunbar, on Dysentery.

James Maxwell Ferguson, on Typhus or Continued Fever.

James George Fraser, on the various Lusus Naturæ occurring in the Arterial System.

Huntly George Gordon, on Croup.

James Grant, on Transmission of Physical and Mental Qualities from Parents to Offspring.

Enoch Nasmyth Houston, What influence does the state of the Parents exert at the time of Conception on the Future Offspring?

John Hunter, on Cataract.

Keith Jopp, on Peripneumonia.

George Skene Keith, on Acute Articular Rheumatism.

James Kirkpatrick, on Ulcers.

Alexander Kirkwood, on Dysentery, especially as it occurs in Military Practice.

Thomas Lookup, on the Evolution of Heat in Organized Beings.

John M'Cosh, on the Prospects and Practice of a Bengal Medical Officer.

George Mackay, on Dysentery.

William Macleod, on Phthisis Pulmonalis.

William Spence Pringle, on Concussion and Compression of the Brain.

Francis Reid, on Asphyxia, and on Death by Strangulation, Suspension, Smoothering, &c. considered in reference to Physiology, Pathology, and Medical Jurisprudence.

Henry Richardson, on Rheumatism.

John Thom Sanderson, on Club-foot.

Walter Scott, on the Chemical Processes by which Arsenious Acid may be detected.

William Smith, on Acute Hydrocephalus.

James Steel, on the Symptoms and Treatment of Pneumonia.

William Stuart, on Death by Hanging.

Robert Taylor, on Diabetes Mellitus.

William Mackie Turnbull, on Uterine Hæmorrhage.

David Wilson, on the Stricture of the Urethra.

Charles Alexander Winchester, on Dysentery.

David Wyllie, on Delirium Tremens.

### FROM ENGLAND.

William Henry Ashley, on the Circulation of Vegetables.

William Bates, on Diabetes Mellitus.

William Bowie, on Insanity.

Henry G. Bull, on the Diagnosis and Semeiology of Cerebral Diseases.

William Catlett, on certain Physiological and hitherto little noticed Effects of the Ergot of Rye on the Process of Human Parturition.

William Dalton, Some Remarks on the Disease called "False Hydatids" of the Human Kidneys.

Richard Gumbleton Daunt, on Acute Inflammation of the Pulmonary Parenchyma in the Adult.

William Michael Malbone Fosbroke, on Hydatids in the Lungs, and their supposed Analogy to Tubercle.

Richard Giles, on Idiopathic Acute Bronchitis.

John Graham, on Bronchocele.

James Harrison, on the Nervous Power or Agency.

Edwin Haward, on Infantile Mortality, or an Inquiry into its Causes.

Henry Holmes, on Phthisis Pulmonalis

Thomas Holt, on the States of the System indicated on the Face.

Henry Homer, on Hydrocephalus Acutus.

George Horniblow, on Cancer.

William Rhodes James, on Asphyxia by Submersion.

Albert de Mierre—To what are the Changes occurring at the time of Puberty in the Male to be attributed? and how far do they depend on the Secretion of the Seminal Fluid?

James Miller, on Urinary Calculus, with some remarks upon its Treatment.

James Russell, on Phthisis.

Edward Henry Sieveking, on Erysipelas.

John Edward Stephens, on the Induction of Premature Labour.

Robert John Stevenson, on Outlines of General Orthopædia.

John Underwood, on Tubercle.

William Wood, on Uterine Hemorrhage.

### FROM IRELAND.

Alexander Armstrong, on the Diagnosis of Diseases of the Heart, Lungs, and their investing Membranes.

John Arthur, on the Symptoms and Treatment of Pneumonia.

Joseph Beattie, on Tetanus.

Ethelbert Harry Blake, on Puerperal Fever.

John James Bowie, on Strabismus.

Joshua Bull, on Croup.

Robert Villiers George, on Hæmorrhage from the Lungs.

Alexander Gordon, on the Granular Disease of the Kidney.

John Harrison, on the Symptoms and Treatment of Hydrocele.

John Henderson, on Erysipelas.

Edward Moorhead, on the Anatomy and Development of the Eye.

Goodwin Richard Purcell, O'Leary, on the Distribution of the Nervous Fibres through their centres.

Thomas Osburne, on Arterial Hæmorrhage.

John Trimble Robinson, on the Symptoms and Treatment of Scarlatina.

Thomas Wilkins Smith, on Death from Drowning, considered with respect to Medical Jurisprudence

Robert Synnot, on Mortification.

Hastings Twiss, on Paralysis of the Motor Nerves of the Eye.

Alexander Wark, on Respiration.

James Young, on Bronchitis.

### FROM GIBRALTAR.

Wildgrave Rock Thompson, on Typhus Fever.

### FROM ITALY.

Joseph Giglioli—An Introduction to a Dynamical Theory of Nature.

### FROM POLAND.

Severinus Wielobycki, on Dyspepsia.

### FROM NOVA SCOTIA.

James Ratchford de Wolfe, on Delirium Tremens.

Simon Fetch, on Cases and Observations illustrative of Mechanism and Management of Parturition.

David Gordon, on Ulcers.

### FROM NEW BRUNSWICK.

George Mountain Odell, on Idiopathic Apoplexy.

### FROM CANADA.

William Daniel Morrin, on Asthma.

### FROM NORTH AMERICA.

James Maxwell Reynolds, on Uterine Hæmorrhage.

### FROM JAMAICA.

John Edward Bird, on Infanticide.

### FROM ST VINCENTS.

William Huggins, on Erysipelas.

### FROM BARBADOES.

Francis Greenidge Browne, on the connexion between Disordered

Respiration and Affections of Nerves.

John Francis Greenidge, on the Literature of Uterine Hæmorrhage before Delivery.

James Manning, on the Morbid States of the Uterus and its Appendages.

FROM CEYLON.

James George Atkinson, on certain Forms of Diseases simulating Inflammation.

Edward Frederick Kelaart—Contributions to the Medical Topography of Ceylon, with Observations on some of its Natural Productions.

FROM THE EAST INDIES.

William Fasken, on Acute Hepatitis.

John Evan Freeman, on Opium; its Effects on the Healthy Subject, and its Therapeutic Influence.

Thomas Goldie Scott, on Apoplexy; its Varieties, Diagnosis, and Treatment.

*Surgeons' Hall, Edinburgh,* 31*st August* 1841.—Since 31st August last, the following Gentlemen have offered themselves as Candidates for the Diploma of the Royal College of Surgeons of Edinburgh, and after producing satisfactory evidence that they had completed the course of study prescribed by the College, have been admitted to examination, and found fully qualified to practise the arts of Anatomy, Surgery, and Pharmacy, and have received Diplomas as Licentiates of the College accordingly.

*Scotland.*

Adams, Kenneth M'K.
Adams, James Maxwell
Anderson, Thomas
Anderson, Charles A.
Annan, Ebenezer
Armstrong, William
Barker, Wm. Thomson
Beith, Robert
Beveridge, James Hall
Birse, James
Brown, Samuel
Buchanan, Alexander
Buie, William
Campbell, William
Campbell, Chas. Grantt
Clark, Hugh
Comrie, John Dickson
Cossar, Thomas
Cullen, James
Cumming, Alexander
Denham, John
Dickson, Walter
Douglas, Robt. Hamilton
Duff, George
Ewen, William Donald
Fergusson, John
Finlayson, William
Fiddes, Alexander
Fleming, James Boyd
Forster, John
Fraser, Alexander John
Fraser, William
Glen, Walter
Gordon, Huntly George
Gow, Norman
Grant, James
Gray, James Rodk.
Grierson, Thomas Boyle
Hally, John
Hardie, James H.
Houston, E. Nasmyth
Hunter, John
Hunter, John
Jamieson, Gavin
Junor, John Balfour
Keith, George Skene
Kennedy, Ken. M'K.
King, Kelburne
Knight, John Brown
Logie, James S. S.
Logie, Cosmo
Lookup, Thomas
Mackay, George
Macdonald, J. T. F.
Mackenzie, Richard J.
Mackintosh, James
MacLaren, A. Connell
MacLeod, William
Macleod, William
M'Cormack, William
M'George, Samuel J.
Meikleham, G. C.
Middleton, David
Miller, John Robert
Muir, William Mure,
Murdoch, James
Neill, Alexander
Nicolson, J. Balfour
Orr, Robert Scott
Paton, William
Patrick, James
Pridie, James Denholm
Pringle, Andrew
Reid, Francis
Reoch, John Fowler
Richardson, Henry
Robertson, James
Robertson, Donald
Sanderson, John Thom
Scott, Walter
Scott, William
Shier, David
Simpson, Alexander
Smart, Thomas
Smith, John Young
Smith, William
Smith, James
Smith, William
Smith, William Beattie
Steel, James
Stein, James
Stuart, William
Sutherland, George
Traill, William
Turnbull, W. Mackie
Watson, James Inglis
Wilson, Adam
Winchester, Chas. Alex.
Wright, John
Wright, Patrick
Wylie, David
Young, Thos. Halliday

*England.*

Bowie, William
Berncastle, Julius
Brown, George, William
Budd, Septimus
Bull, Henry Graves
Cortis, Wm. Smithson
Daunt, Richard G.

Davenport, C. Thomas
Goddard, Samuel Palmer
Graham, John
Gwynne, Wm. Cust
Hains, John P. F. P.
Heslop, Ralph Clayton
Hollis, Charles Wise
Holt, Thomas
James, William Rhodes
Negus, Fysher
Scratchley, George
Selby, Prideaux
Sieveking, Edward
Stephens, John Edward
Stewart, Ludovick Chas.
Walsh, Francis Delaval
Watson, Joseph
Wood, William

*Ireland.*

Armstrong, Alexander
Baxter, W. Raleigh
Blake, Ethelbert Henry
Bowie, John James
Cahill, Thomas
Fant, Patrick
Forsyth, James
Gordon, Alexander
Leslie, John
Marlow, B. William
Moorhead, Edward
Musgrave, Samuel
O'Brien, Morgan
O'Connor, J. James
Smith, William
Tomb, Henry
Wark, Alexander

*Abroad.*

Bird, John Edwards
Davids, Sarkis Carapiet
De Wolfe, James R.
Freeman, John Evan
Gordon, David
Mason, James Innes
Loinsworth, Fred. H.
Ogilvie, G. Mathieson
Peters, Harry
Rowand, Alexander
Scot, Thomas Goldie
Sprott, Robert Porter
Tulloh, James Stewart
Wielobycki, Severinus

Extracted from the Records of the Royal College, by
John Scott, *pro Sec.*

*The Provincial Medical and Surgical Association.*—This numerous and highly respectable body held its ninth anniversary on Wednesday the 4th and Thursday the 5th of August 1841, at York. The council held their preparatory meeting on Tuesday the 3d, at the Museum, when all the preliminary matters were arranged as to the general business of the meetings. The first general meeting was held on Wednesday the 4th, at one P. M. at the Theatre of the Museum.

The retiring president, Dr Steed of Southampton, being unavoidably absent, in consequence of family affliction, the chair was taken in his behalf by Dr Barlow of Bath, and then vacated to Dr Goldie of York, the President elect, who then addressed the meeting on the several subjects to come before them, and, in the name of the Mayor, invited their members to visit and inspect the public institutions, and among others the Museum, the Lunatic Asylum, and the Retreat.

Dr Hastings then read the report of the council by which it appears that the association consists of 1250 members; that the income last year amounted to L. 1440, the expenditure to L. 858, and that there is a clear balance of L. 582. Other subjects adverted to were the question of some improvement in the mode of affording medical assistance under the new Poor Law Act, Empiricism, Medical Reform, the Benevolent Fund, and the proposition of a congratulatory address to the Queen. The report and its suggestions were adopted.

At the second general meeting, held the same evening in the same place, Dr Black of Manchester was appointed to prepare the Medical Retrospective Address for the ensuing year, and the address of the section on Medical Topography was read by Dr Streeten of Worcester in the absence of Mr Addison.

At the third general meeting, held on Thursday the 5th at 12, Dr Streeten read the Retrospective Medical Address, which, though lengthened, was listened to with great attention throughout.

The dinner was held the same evening at the Guildhall at 6 P. M., attended by 100 gentlemen,—Dr Goldie in the chair, supported on the right by the very Reverend the Dean of York. The founder, Dr Hastings, was unfortunately absent, having been suddenly summoned to Worcester.

The next meeting of the association is to be held at Exeter; and Mr James of Exeter is President-elect.

This association continues to command the respect of the profession throughout the empire. Their objects are most laudable; they have already rendered good service to the cause of medical science, and are continuing their career of useful exertion; they have also made a strong impression on the improper and discreditable mode in which the services of medical practitioners are engaged under the new Poor Law; and they are busily occupied in promoting rational, moderate, and practicable reform in the medical profession.

In behalf of this latter object, the Association propose soon to address the present Ministry, intreating them to take the whole question into early consideration. Though our past experience does not fill us with very sanguine expectations from the Legislature on this subject, still we think, where the plan of reform is moderate, rational, and practicable, as we have already stated, it is much more likely to engage the attention, and insure the favour of the Members of both Houses, than where it consists of wild schemes of extensive changes, many chimerical and untried, and some totally impracticable, however excellent in speculation. It appears to us that neither the draft suggested by Mr Warburton, nor the bill actually proposed by Mr Hawes, was calculated to produce useful or rational changes in the state of the medical profession; and that this opinion rests on good foundation is manifest, not only from the commentary given by the Royal College of Surgeons in this city, and the address on them presented by the College of Physicians, but in a manner not less distinct, by the elaborate Report of the Council of the North of England Association, published in this number, and also from what we see had taken place in the council meeting of the Provincial Medical Association.

There are at this moment in the medical profession, two classes of persons desiring reform in education and the privileges of the profession. The one set consists of men of excellent dispositions, good hearts, we believe, and well educated, but rash, with more zeal than discretion; who see no difficulties in the execution of any plans, which they may propose; who would overturn the whole of the old institutions, as oppressive, tyrannical, and unsuited to the spirit of the age, and erect in their places some new establishments, one or more, all modelled according to their own not very rational or matured deliberations. The other body of reformers are more moderate in their wishes and expectations, and wish to preserve all the old institutions, or the most efficient of them, restraining their injurious powers, clearing away all their prejudicial incumbrances on human exertion, and directing their efforts in the proper channels, to protect the regular, and discourage the irregular practitioner, to maintain the dignity and respectability of the profession, and to foster and promote the cultivation of science. We are glad to see that the members of the association are guided principally by the latter class of reformers.

*Proposed Transactions by the Royal College of Surgeons in London.*—The Council proposing to publish, in the course of the ensuing year, a volume, to be entitled "Transactions of the Royal College of Surgeons in London," invite, from the members of the College, and other scientific persons, communications relating to the improvement of anatomical and surgical science.

The subjects proposed to be included in this publication are specified in the following extract from the ordinances of the College:—

"The Transactions shall consist of Orginal Communications on Surgical subjects; Collegial and Jacksonian Prize Dissertations, deemed of sufficient originality and merit: Original Memoirs on Human Anatomy; Original Memoirs on Comparative Anatomy; Anatomical Monographs of rare Animals, dissected in the Museum of the College: Explanations of, and Commentaries on, important Preparations in the Museum, with illustrative Plates; Statistical Reports from Hospitals. It is requested that papers intended for publication in this volume may be transmitted to the President, at the College, on or before the 1st of May 1842.

*28th July* 1841. EDMUND BELFOUR, *Secretary.*

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